

Sport Diver

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THE JOURNAL OF SPORT DIVING

VOL. 1, NO. 1

SPRING 77



Bonaire's Garden of Eden • Hans Hass Today • The Chamber
Shark, Today's Enigma • Red Sea Gallery • Michigan's Silent Wrecks
A Pilot Suicide • Understanding Underwater Photography • Florida Keys



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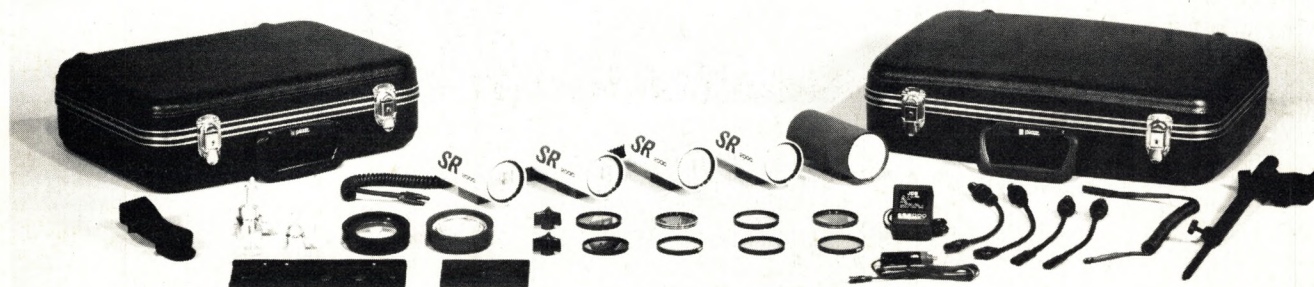


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Sport Diver

CONTENTS

VOL. 1, NO. 1 / SPRING 1977

THE BAHAMAS

Dive Historic Harbour Island *Richard H. Stewart*

Discovery of an outstanding dive, "the Plateau," in the Bahama out islands.

12



AN ULTIMATE Superboat *Don McGrew*

The latest in designs combining effortless diving with comfort.

30

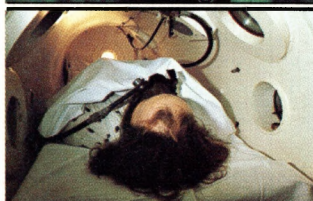


REEFS

Oasis in the Sea *Jerry and Idaz Greenberg*

A look at hard corals; from the photographer/writer team series, "The Living Reef."

48



GALLERY

The Red Sea *Rick Frehsee*

A pictorial visit through one of the most colorful and abounding bodies of water in the world.

52



THE STATES

Silent Michigan Wrecks *Ken Hafner*

They roamed the Great Lakes, only to become eternally bound by them.

65



DEPARTMENTS

Seacology	24
New Equipment	27
The Edible Sea	39
Beneath The Sea	62
Instructor Notes	101
Underwater Photography	104
Navy Diver	107
Dive Shop Directory	127

COVER: Sari Gains swims along the Red Sea wall known as the *Sea Garden*, the Coast of Sharm-El-Shiek, Sinai desert, Israel. Photograph by Rick Frehsee. Nikonos, 15mm f/2.8 lens, K25 film and Subsea MK150 Strobe. Story Page 52.



70

TODAY'S ENIGMA

Shark *Patricia Bird*

An informative review of shark behavior; plus, a profile graph for quick identification.

75

PROFILE

Hans Hass Today *Tim O'Keefe*

A man of Cousteau character; a pioneer, underwater photographer, a writer and today a very active diver.

81

CARIBBEAN

Bonaire's Garden *Richard H. Stewart*

The Netherlands Antilles, less than a stone's throw from the coast of Venezuela, are once again rediscovered.

94

THE STATES

Florida Keys *Gary Osgood*

Visited by thousands each year, Pennekamp Park continues its popularity climb as a nearby tropical dive.

120

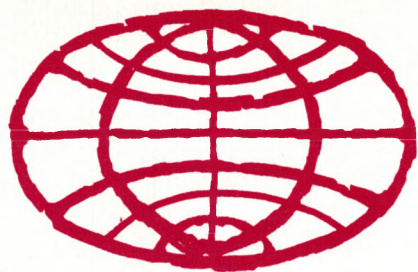
CONTROVERSEA

A Pilot Suicide *Kathy Bentley*

Ear parasites? A baffling question concerning whale strands.

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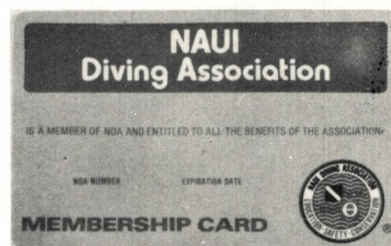
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Editorial

FROM THE PUBLISHER

Truly, the entrance of a second nationally circulated diving publication clearly indicates the increasing popularity of sport diving. As one of the fastest growing recreational sports in the United States, scuba has finally evolved from a recreation exclusively for the young, daring and athletic minded, to one which involves both the average man and woman, young and old alike.

Today's professional training organizations, as well as the manufacturers, have contributed much to improve the safety conditions of the sport, resulting in a surge of people eager to become involved in recreational sport diving.

SPORT DIVER MAGAZINE has finally emerged to fulfill the sport diver's increasing demands for more underwater related reading material and to provide an additional source of interesting information concerning the activities nationwide and internationally.

Our primary goal: to entertain our readers by providing a variety of exciting features each quarter. To do so, we have produced this publication utilizing the most modern printing facilities to ensure the highest quality color reproduction, which, as you will see, covers nearly three fourths of



our pages. Never before has there been a diving publication to utilize so much color.

In this issue SPORT DIVER will move slowly through the incredible waters and reefs of the Red Sea as seen by underwater photojournalist Rick Frehsee on his expedition to record on film the unique and colorful life around the coast of the Sinai peninsula; we'll show you an inside view of a recompression chamber and explain the reasons for supporting such vital equipment; and take a look at the puzzling mass suicide of

an already endangered species — the whale. You'll see just how easy it can be to find yourself enjoying the spectacular reefs around Bonaire and just how close you are to some of the greatest diving here in the States.

This is only a small sample of what is contained within the pages of this issue; and only the beginning of what will be the most exciting publication in the history of sport diving. Enjoy your journey through SPORT DIVER from cover to cover and brace yourself for our next issue this Summer.



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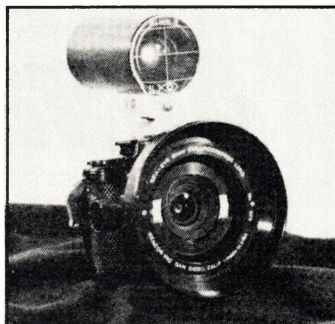
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1. Saltwater color.
2. Saltwater b&w.
3. Freshwater color.
4. Freshwater b&w.
5. Fixed focus Photography-color.
6. Fixed focus b&w (For Instamatic type fixed focus camera's only).
7. Creative photography-special processing, infrared, solarization, etc.
8. Movies-fresh or saltwater.

COMPETITION RULES:

Contest is open to all amateur photographers.

All entries must be sent pre-paid with pre-addressed return envelope and sufficient return postage. All entries will be returned the week of, or before the final winning announcement.

Print size shall be a minimum of 3½x4½ inches, maximum of 8x10 inches, glossy finish and mounted on an 8x10 inch mount board. Entrants name, address and print title must appear on the back of each board.

Slides must be 2x2 inches mounted and inserted in plastic storage protectors with the entrant's name, address and title.

Movies must be 8mm, super 8, or 16 mm with or without sound, 15 minutes or less, with 75% or more exposed underwater and containing entrants name, address and the film title marked on the container and film leader.

All possible care will be exercised, but no responsibility will be assumed by SPORT DIVER MAGAZINE or UPIA for the loss or damage of entries.

Judging shall be done by the photo competition committee using a basic point system on technique, composition, color, quality and story. Decision of the committee will be final.

Winning photographs will be announced and displayed in the Spring 78 issue of SPORT DIVER MAGAZINE. Entrants completed entry form acknowledges reprint rights to publish by SPORT DIVER MAGAZINE.



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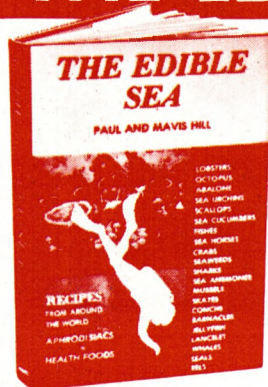
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Dick Anderson	John Cronin
Lloyd Bridges	Robert Cahill
Paul Tzimoulis	Glen Egstrom
"Buzz" Aldrin	Bruce Halstead
Ron/Valerie Taylor	Betty Tomasi
Roy Hauser	Jack Chappell
Jim Stewart	Ed Brawley

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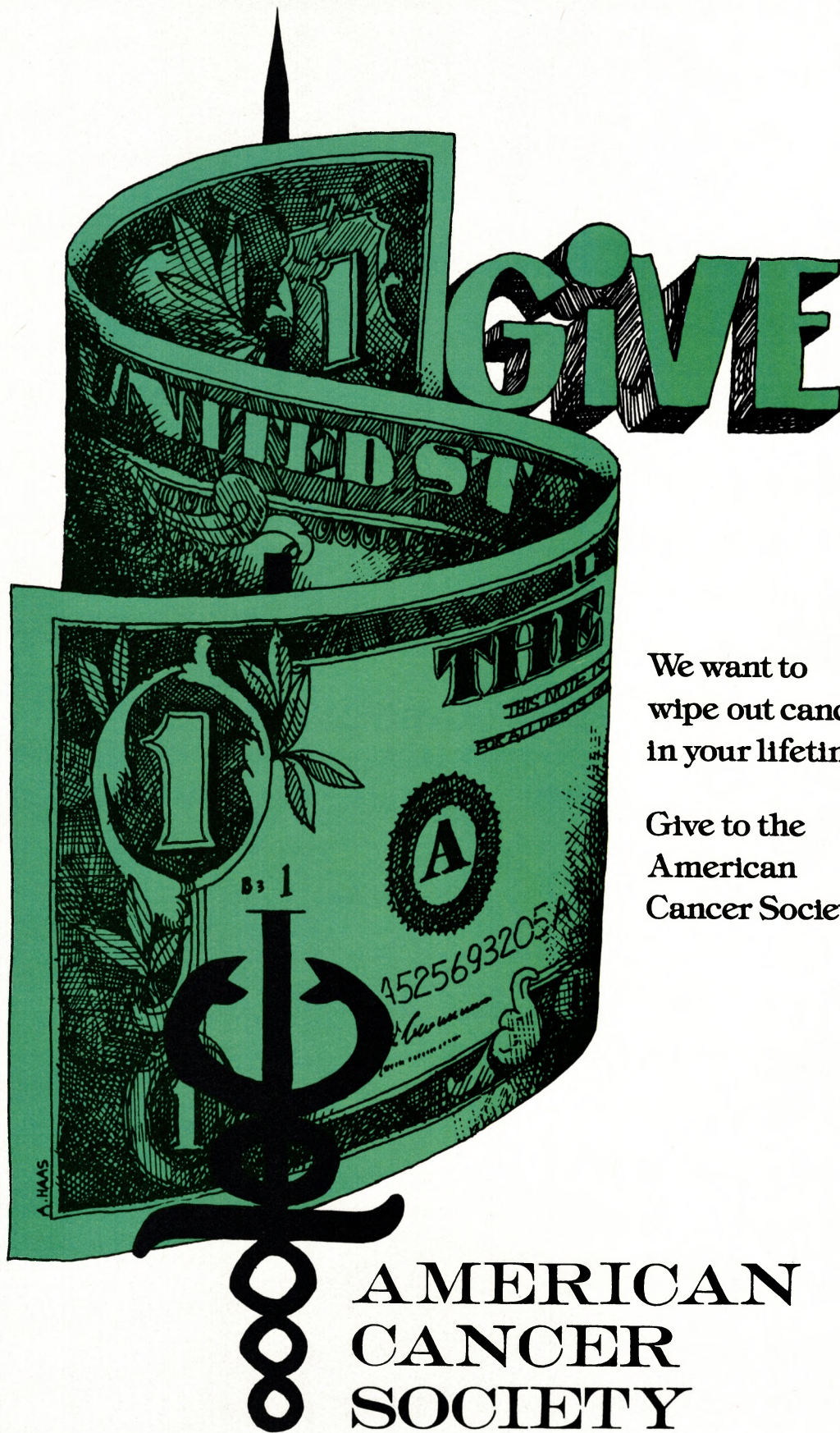
A diver is shown underwater, wearing a mask and a red life vest, holding a large orange cylindrical device (a Diver Propulsion Vehicle) with both hands. The device has a black logo on its side and a large circular opening at the front. The diver is surrounded by green seaweed and bubbles, suggesting an underwater environment.

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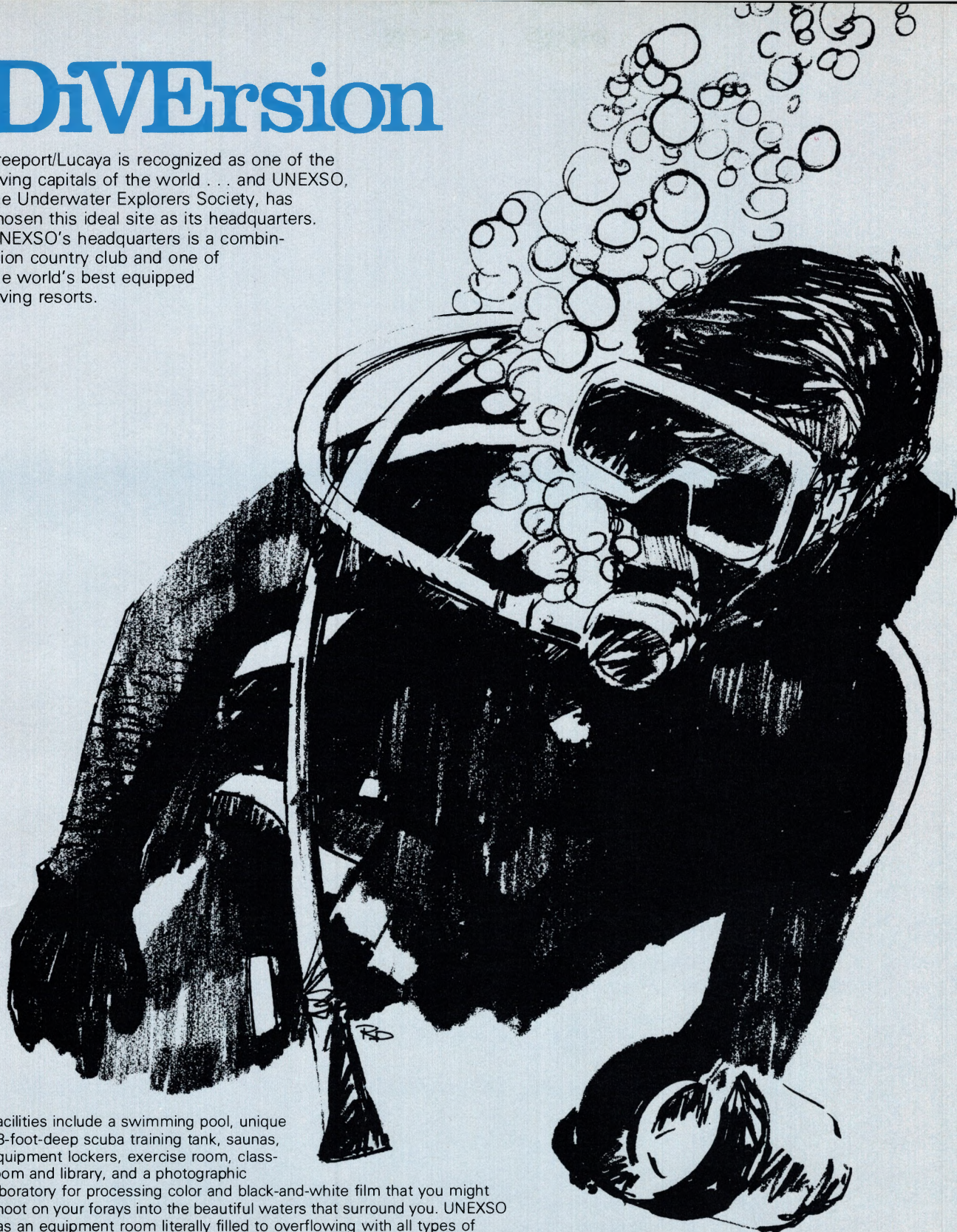


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Dark blue holes of deep water can be seen by air throughout the Bahamas. UNEXSO has done much exploring of these story-filled caves both offshore and inland as well.

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Text and photographs by Richard H. Stewart

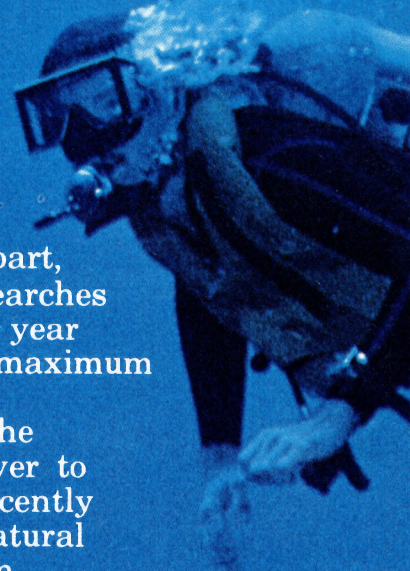
DIVE HISTORIC HARBOUR ISLAND

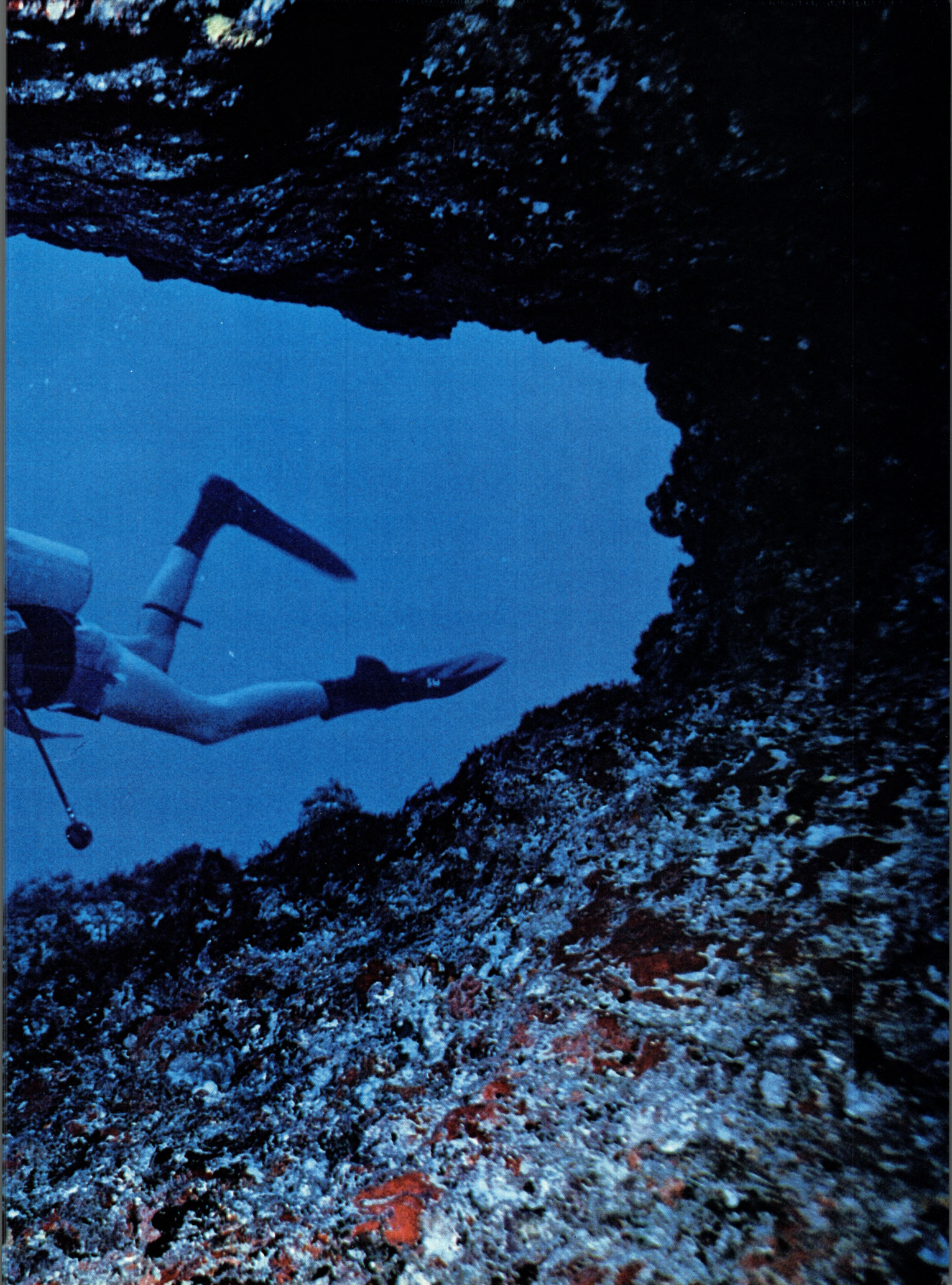


amount of enjoyment per dollar.

The Bahamas, because of their close proximity to the States, make it affordable for even the middle income diver to enjoy clear, blue waters and tropical marine life. Only recently have the out-island resorts begun promoting their own natural assets; the beautiful sea, coral reefs, and out-island charm, offering the vacationing diver all of the comforts of home along with spectacular diving.

It seems for the most part, today's traveling diver searches carefully for that once a year vacation which offers a maximum







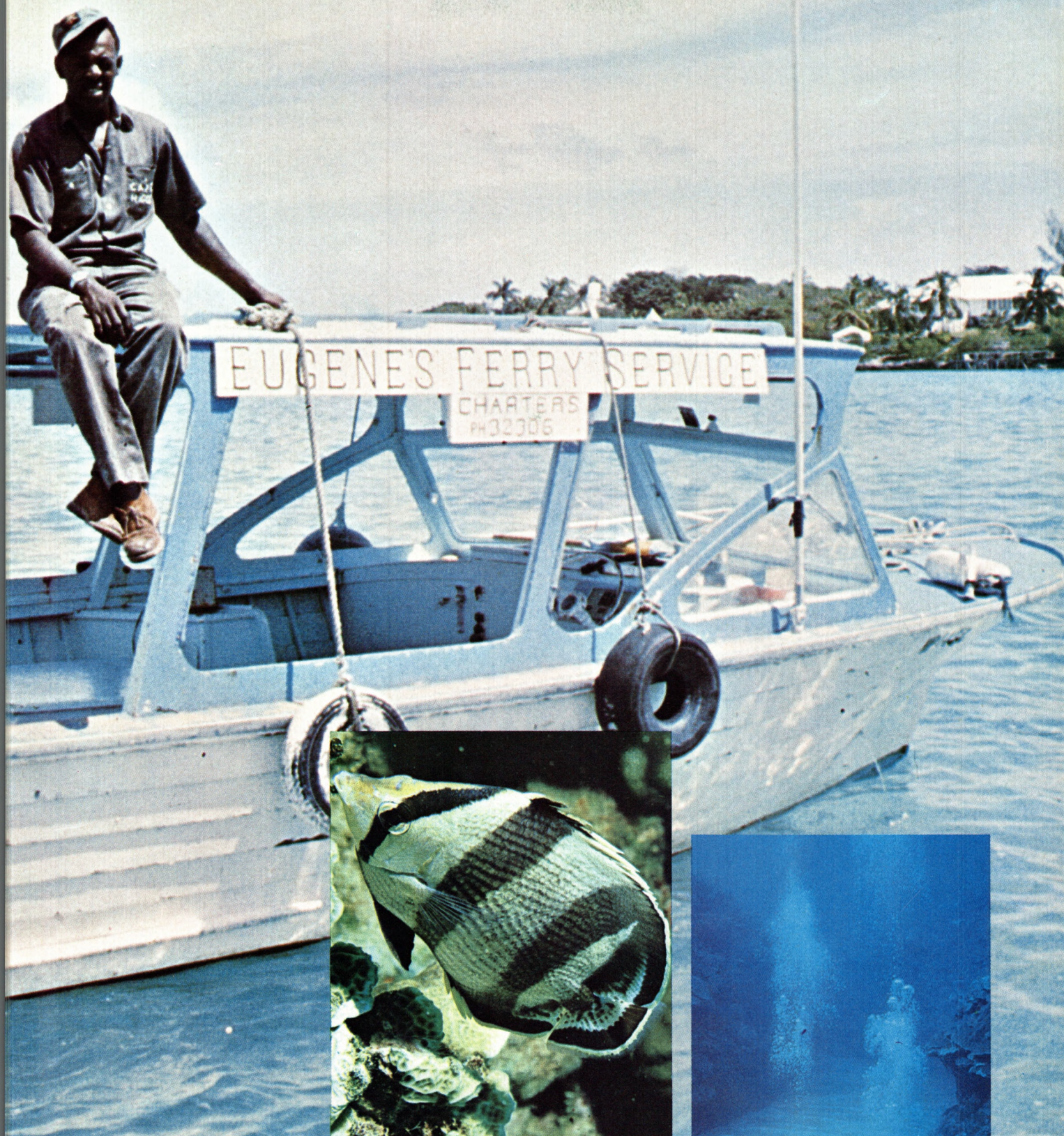
One such progressive resort is the Ramora Bay Club. Situated on the tiny land mass of Harbour Island, the area exists today much as it did several hundred years ago, its small harbor filled with dozens of native fishing sloops, children playing joyfully along the narrow streets and the local straw merchants bargaining their wares.

Eight years ago Roy Schmidt, owner-manager of the Ramora Bay Club, recognized the potential of Harbour Island to develop into one of the Bahamas' most unique and beautiful diving areas, he began reorganizing his club to accomodate vacationing

sport divers, gradually upgrading the facilities from his original worn out surface supplied Hooka air system, to the present equipment of twelve tanks, back pacs and regulators.

Utilizing their two 25 foot Delta inboard dive boats, Roy and his dive masters Roger Hale and William Bullard can, within minutes, transport diving guests to some of the most incredible reef diving available anywhere in the Bahamas. Close to a mile south of the club is the spectacular reef, the Plateau.





Sloping gradually from a depth of forty feet to around one hundred feet, eventually dropping into the depths of the Atlantic, the Plateau appears scarred from the centuries of undercurrents eroding deep gorges and canyons into the once solid reef.

Coral colonies are nevertheless thriving and healthy, and continue to amaze the diver.

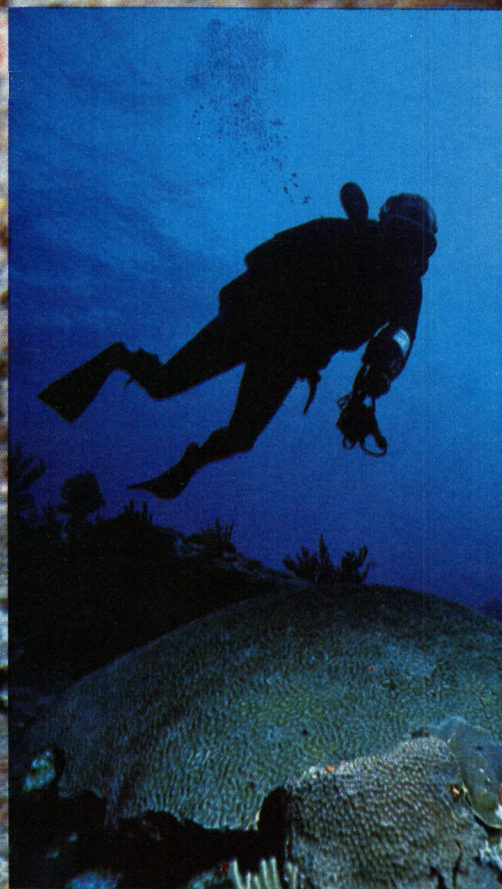




Piles of star coral blanket over the reefs providing for the thousands of colorful tropicals that make it their home. Gliding downward towards the mountainous underwater region, the walls of the gorges behold some of the most amazing varieties of fish and marine life busily darting about retrieving life supporting algae, and providing the diver with a brilliant kaleidoscope showing.

In the same area of the Plateau there is another spot that offers the diver a completely contrasting dive in comparison to the reefs.

The sea crashes into the steep cliff lined coast, slowly crumbling the stone as once again the natural forces of nature's erosion provide us with an exciting dive.



The sea floor, under the shadows of the massive cliffs, is littered with all sizes of boulders and the feeling of exploration runs through your body as you swim around rocks that tower about you, passing through the numerous holes and caves that have been carved by the generations of backwash actions of the crashing waves. Yellow tailed Goatfish dominate the area, practically engulfing the diver who mistakenly attempts to feed the pin cushioned sea urchin to a few friendly stragglers.

Around the north point of Harbour Island, towards the island of Spanish Wales, lies the twisted wreckage of a train that plunged into the sea after the barge on which it was being transported struck the shallow reef during a violent storm in the late 1800's. All that remains are a number of large round wheels still on their axles and the corroded frame of the box car.



continued on page 30



Douglas Faulkner

Is the Nassau grouper always the same color?

No. As one of nature's more adept quick-change artists, this fish can change its body coloration in seconds from dark brown to pale gray, or to a barred pattern. Sometimes its entire body has a pinkish tinge.

Transmitting factual information to the public in an entertaining fashion is a full-time activity of the International Oceanographic Foundation (IOF). It does so through its 64-page full-color bimonthly magazine *Sea Frontiers*, the bimonthly newsletter *Sea Secrets*, personalized question-answering and reference services, Sea Safaris tours, rental film library, and its 2-acre

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Thousands of divers complement their on-the-spot underwater learning experiences with the educational benefits of membership in the IOF. Members are also entitled to a discount on book purchases and free admission to Planet Ocean, as well as a discount on purchases in the Gift Shop.

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Hydrostatic Testing: The Final Flex.

by Steve Matheny

On an early 1973 spring afternoon, a dive shop in southern Canada was bombed and very nearly destroyed. Who was the villain? An irate customer . . . a sex-crazed mountie? . . . No, the destruction was caused by a normally charged scuba cylinder. The owner of the dive shop was about to close his doors after a somewhat uneventful afternoon when an old buddy came in to get an airfill. His cylinder was a 71.2 cu. ft. steel cylinder which was approximately 16 years old. "This tank is out of hydro" reported the owner of the shop, who was anxious to reach his evening meal. The surprised tank owner responded, "I don't have any other tanks to use . . . C'mon, fill it for me one last time and I'll be sure to bring it to you for retest the first part of the week." Anxious not to be delayed any longer, the shop owner consented to fill the cylinder.

Hooking the cylinder up to his antiquated filling system, the pressure began to climb. 300 psi . . . 700 psi . . . 1100 psi . . . 1700 psi . . . suddenly, the cylinder walls loosened their hold, the tank exploded and unleashed kinetic energy equal to a 2 ton automobile striking a wall at over 200 miles per hour. The storage bank system was catapulted off its foundation and it, along with the compressor system (total weight 2000 lbs., plus) was hurled through a wall and embedded into another wall some 20-25 feet away. Both the dive shop owner and the customer were killed instantly.



The average diver does not really appreciate the terrible force which is stored in the vessel he carries on his back. This miniature bomb, which we call a tank, undergoes constant stress. Every time the tank is filled the flexible walls stretch. Every time it is drained of its air, it recompresses. Stretch and flex . . . stretch and flex . . . the normal diving cylinder begins to lose part or all of its elasticity, depending upon the frequency of usage and care given to the cylinder. How then, does one tell when his cylinder is worn out and unsafe for further usage?

The Interstate Commerce Commission once held responsibility for safe maintenance of gas cylinders, but that task has now been handed over to the U.S. Department of Transportation. The D.O.T. has, by custom, accepted and adopted into its own regulations those suggestions offered by the Compressed Gas Association, Inc.

These suggestions are funneled specifically to the Bureau of Explosives, Department of Railroads, for implementation. It is this agency which has the authority to inspect and certify hydrostatic testing centers. All cylinders which are transported across state lines or are used commercially come under regulatory authority of the D.O.T. Compressed gas cylinders are tested first at the factory and are then required to be retested at five year intervals. Tanks may be tested at intervals less than five years, if they endure extraordinary usage or abuse, and of course, this is sound preventive maintenance.

D.O.T. Regulation 173.34(e) requires that prior to this retest all vessels must undergo an extensive external and internal inspection. (N.A.S.D.S.'s V.I.P. is an example in the diving industry). All cylinders rejected as a result of this visual examination are condemned immediately. *General Guidelines for Visual Inspection of Compressed Gas Cylinders* is available through the Compressed Gas Association, Pamphlet No. C-6. Internal or external corrosion can be severe enough to merit condemning the cylinder, even though the cylinder passes the hydrostatic test. Unfortunately, many hydrostat stations never look inside the cylinder prior to testing. These operators may be passing a cylinder whose walls are ready to rupture through tiny pinholes of rust.

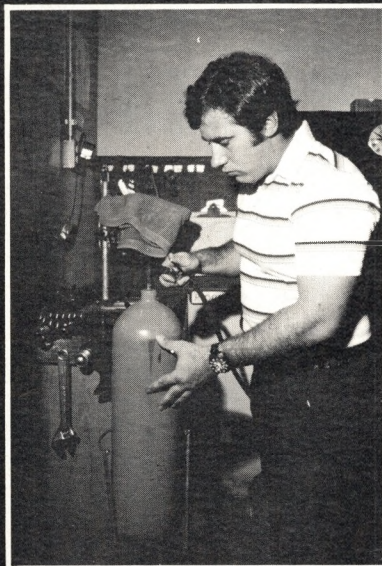
A Hydrostatic Test

After the cylinder has passed Internal Inspection, the operator must decide which method of testing he will use. There are four basic techniques:

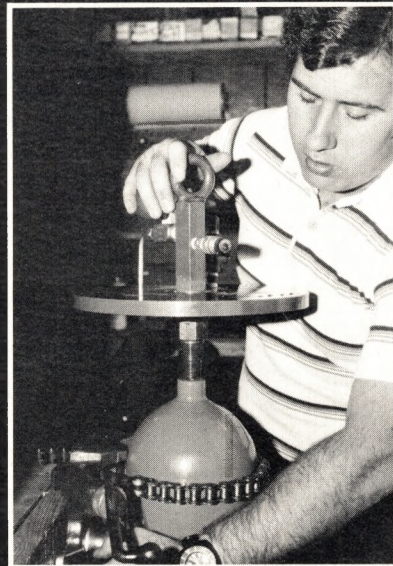
- Water Jacket Volumetric Expansion Method
- Direct Expansion Method
- Pressure Recession Method
- Proof Pressure Method

The most commonly used technique is the first (Water Jacket) and we will restrict ourselves to it primarily. The hydrostatic testing equipment, although utilizing super-high pressures, is probably the safest system in the dive facility. Much safer than the lower pressure air systems because the entire hydro-test takes place with water, which is virtually incompressible. Should a faulty cylinder actually explode, there are minimum fireworks, while a similar cylinder filled with air would unleash awesome and devastating forces.

The testing procedure begins by filling the test cylinder with water. Differences in temperature between water and tank can distort test results and must therefore be minimized. The top of the cylindrical hydro water jacket is then screwed into the tank valve threads: $\frac{1}{2}$ inch pipe, $\frac{1}{2}$ inch fine thread, $\frac{3}{4}$ inch pipe, $\frac{3}{4}$ inch O-ring seal and 1 inch pipe are some common thread sizes. The tank (with hydro fitting attached) is then hoisted up and placed in the water vat or jacket. It is also filled with water. A water tight seal is then formed between vat and fitting by means of clamps or bolts. Drains and valves allow all bubbles to be evacuated from inside the tank and from within the water jacket. The water jacket is open at the bottom to a rubber tube, which, in turn, is connected to a calibrated monometer or burette. Water is pumped into the water jacket by valves. An arbitrary zero level is set on the monometer and this is the point from which the test begins. Test pressure of the test cylinder is computed by taking the rated pressure of the cylinder (that which is stamped on the cylinder) and

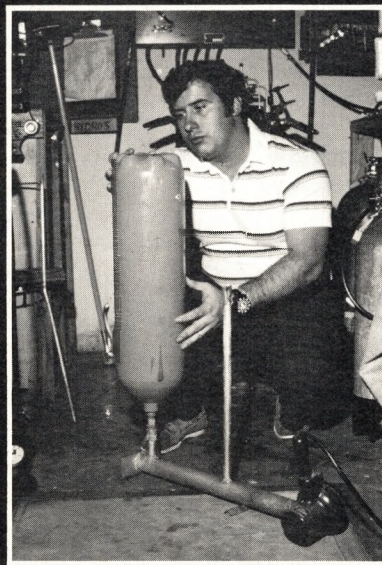


After removing the valve, the tank is filled with water to dissipate all air space.

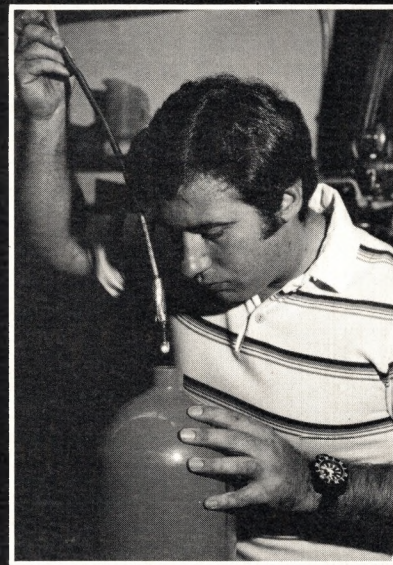


The tank is then adapted to the hydrostat control lid before being placed in the vat.

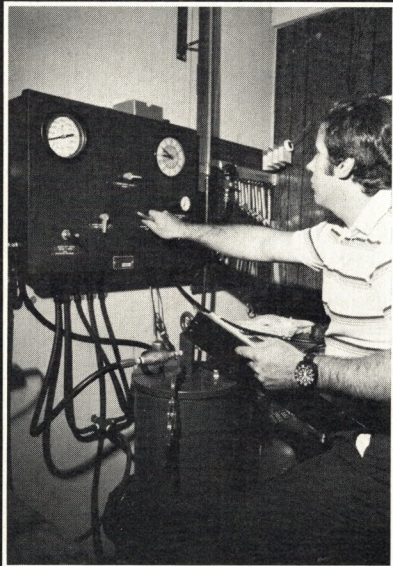
photography by Richard H. Stewart



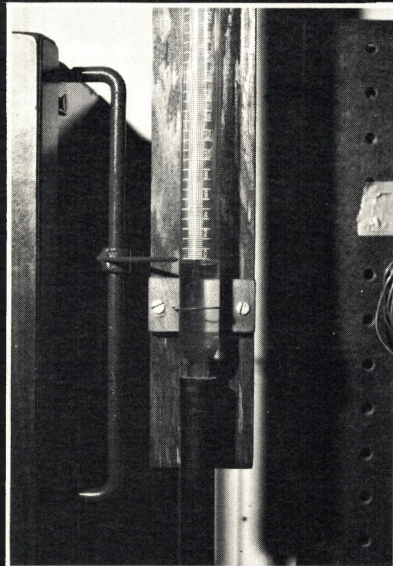
After testing, the tank is mounted on a dryer to eliminate all traces of test water.



Prior to re-assembly, the tank is checked again visually.



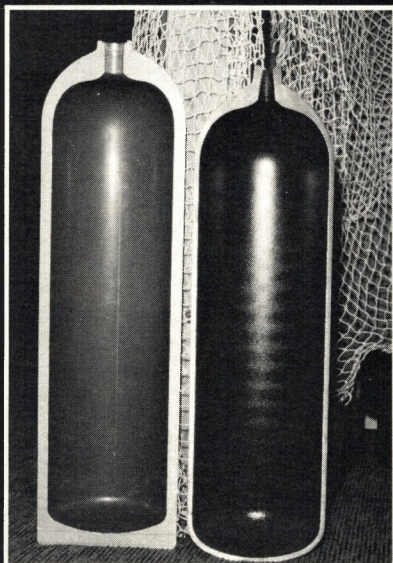
Test procedures are controlled by a series of gauges mounted near the vat.



Expansion is measured by a calibrated tube, called a monometer, which is filled with test water.



After a tank passes the hydro test and visual inspection, a dated VIP sticker is placed on the tank as a permanent record.



Interior remains in original condition much longer if it is properly cared for and serviced regularly.

multiplying it by a factor of $5/3$ or 1.67. This indicates the maximum test pressure. Should some error occur during testing, a retest can be made by adding 10% to the test pressure and then retesting.

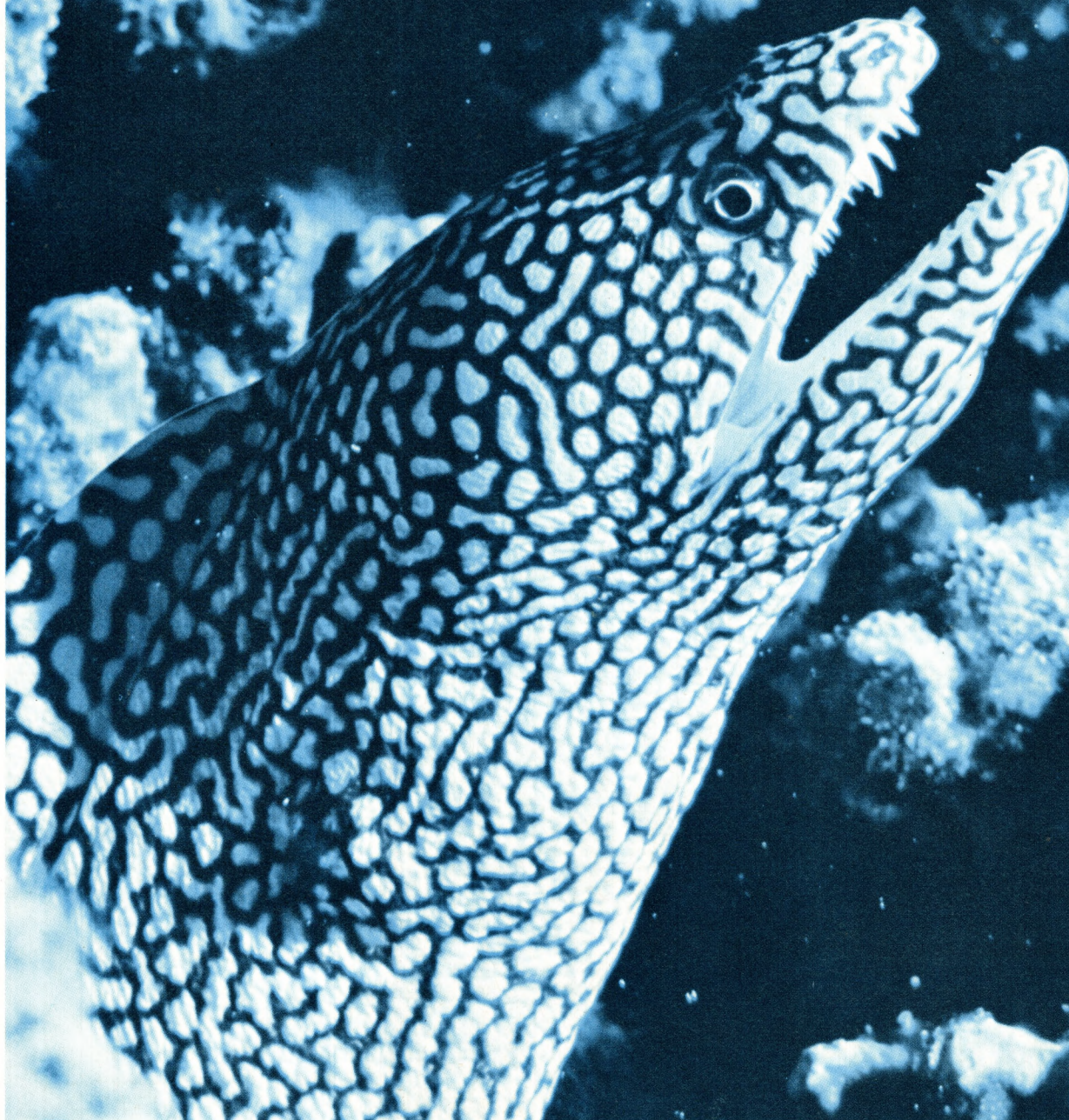
The basic concept of the test is that when pressure is introduced into the cylinder it will expand. As it expands, it pushes water inside the water jacket out of its way. This water has nowhere to go but up the burette. When the cylinder reaches $5/3$'s of rated pressure, the level of water in the burette is measured. It must remain stable for a minimum of 30 seconds. Pressure inside the cylinder is released, and as the cylinder recontracts, water falls from the monometer back into the water jacket. How closely the water level comes to its original starting point determines whether the cylinder passes or not. If permanent expansion does not exceed 10% (for steels) or 12% (for aluminums), the tank passes and a new stamp bearing the month and year of the test below the old date on the cylinder neck, is affixed. Any serious damage to a compressed gas cylinder, such as impact, fire or serious corrosion, should be followed by an immediate retest to determine wall weakening. Visual inspections should be made at intervals of one year or less, depending on usage. Cylinders should be thoroughly dried and revalved to protect cylinder interiors from moisture damage.

Always have your SCUBA cylinder tested at a reputable repair facility (one shady operation usually hydro-tests their customer's cylinders outside the water jacket because it saves time and money, but, of course, in no way measures anything.) If your cylinder fails either visual or hydrostatic test, demand that it be condemned and destroyed. Your life and the lives of others cannot be weighed against the cost of a replacement cylinder. Trust the reputable dive facilities and support their attempts to make your sport safer. We'll all breathe a lot easier.



A LOOK AT THE EEL

COMING THIS FALL IN
SPORT DIVER



photograph by Carl Roessler

IPUM PROGRAM



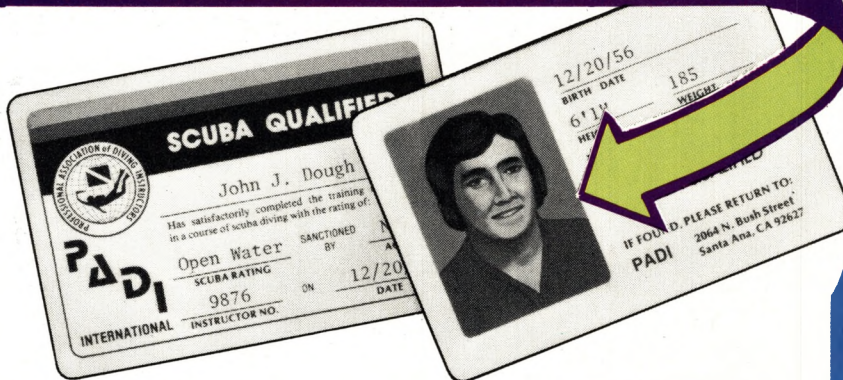
The 5th INTERNATIONAL PHYSICIANS UNDERWATER MEDICINE PROGRAM will be held at the Holiday Inn Resort on the island of Grand Cayman, British West Indies, on April 30 - May 7, 1977.

The medical program is approved by the American Medical Association through the Undersea Medical Society for 25 Continuing Medical Education Category I credits. The academic program will be sponsored by the Undersea Medical Society and co-sponsored by the Cayman Islands Divers, Branch 360 of the British Sub-Aqua Club. The medical program director is Jefferson C. Davis, M.D., Chief, Hyperbaric Medicine, USAF School of Aerospace Medicine and Vice-President of the Undersea Medical Society. Dr. Davis is well-known for his expertise and continued efforts in providing worldwide consultation to physicians in treating diving accidents.

The purpose of the symposium is to develop a thorough understanding of the current concepts of medicine and physiology involved the sport scuba diving. The course is presented by Dr. Davis and his staff has been designed to increase the awareness of physicians in recognizing and treating diving casualties.

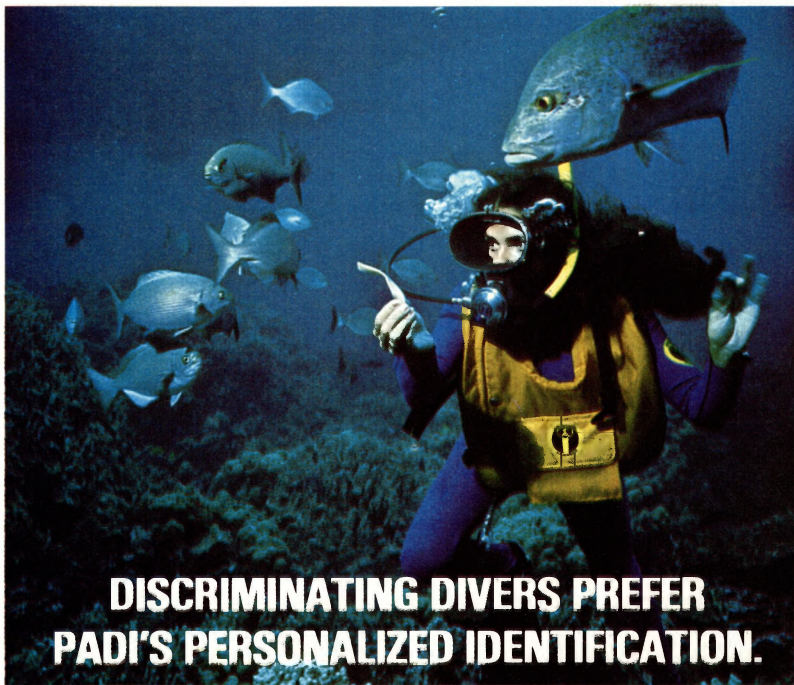
In addition to the medical seminar, a complete diving program on the reefs of Grand Cayman has been arranged by Atlantis Safaris. For complete brochure and academic schedule, please contact Atlantis Safaris, P.O. Box 530303, Miami Shores, Florida 33153. Phone (305) 754-7480.

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3. Your description: birthdate, height, weight, color of eyes and hair.
4. \$5.00 payable to PADI. Mail to PADI, 2064 N. Bush Street, Santa Ana, CA 92706.

PADI NUMBER ONE IN
DIVER EDUCATION

Destruction of a Coral Reef.

by Dr. Phillip Dustan

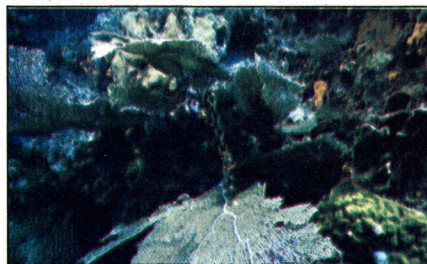


Courtesy of NAUI

The coral reefs of the Florida Keys are small fringing and patch reefs bordering on the edge of the Gulf Stream. The Keys themselves are the remains of fossil reefs that flourished approximately one hundred thousand years ago when sea level was higher than it is today. The Keys' reefs are the most northern reefs in the Atlantic Ocean and, therefore, under great natural stresses (i.e., lower temperatures). Possibly the most complex of all ecosystems, coral reefs are the most beautiful underwater gardens known to man. Reefs are made up of skeletal remains of corals, other animals, and plants which have been cemented together to make a three-dimensional habitat. Thousands of animals, some large, some microscopic, live in the nooks and crannies of this habitat, making the reef a place of wonder to all who see it.

Physical damage to a coral reef occurs naturally during storms and as a result of boring organisms and other predators. The tremendous diversity of life on a reef may be maintained in part by the constant turnover of reef inhabitants as the result of physical disruptions. The addition of divers to the reefs results in a tremendous increase in the destruction. The total effect on the reef community is, at this point, unknown. However, there are specific cases that have been examined which provide insight into the problem.

One of the most common mishaps while diving is to bump into the coral, either breaking it or abrading the surface of the colony. When this happens, the coral immediately begins to repair the wound. The wound, being fresh, bare substrate, is colonized by algae faster than the coral can regrow and even more energy is required by the coral to overgrow the algae. In many instances the coral is unable to recapture its surface area and a permanent blemish marks the colony. Such areas often spread and may be the starting point for algal infections that eventually kill the whole coral colony. In massive colonies the regrowth of an area may take as long as a year and in branching colonies four to eight months, depending on the size of the branch broken. If the damaged coral is displaced from its original growth position it must then reorient its growth patterns to take wave action and light into account.



Sport Diver

Bill Crawford



Coral scars, infested by fast growing algae, eventually kill the entire coral colony (left).

Unable to recapture its surface area, the coral remains permanently blemished (above).



Much of the coral destruction is caused by simple negligence during the placement of boat anchors.

The energy that a coral must expend to repair its damaged surface or limb, is energy that would probably be used for other purposes. It is highly likely that rates of new tissue growth and sexual reproduction are reduced in corals that have been damaged. It is energy that might also be needed to fight off an infection or prepare for a cold winter. Any reallocation in the energy budget of a coral resulting from man's interference must, therefore, be deleterious to the coral reefs.

A popular pastime underwater is to feed urchins to the reef fish. Normally, the fish cannot penetrate the sharp, spined defenses of the urchin, but the urchin is no match for a diving knife. Urchins are herbivores, which means they graze on algae. When the urchin population is reduced the algal population increases. In experiments, it has been shown that the algae can become so abundant as to inhibit the settlement of coral larvae. In other instances the algae may begin to actively overgrow adult coral colonies. While fish feeding is fun and a nice thing to do for the fish, the removal of urchins may pose serious problems to the construction of the reef framework and subsequently destroy the homes of the fish that divers so enjoy watching.

The collecting of marine life is illegal within the boundaries of Pennekamp Park with the exception of lobster, when in season and of legal size. Lobsters are omnivorous nocturnal feeders. Once present in large numbers on the reefs, they are fast becoming rare. Furthermore, the success rate of capture by divers seems low, judging from the number of lobsters seen with broken antennae. The lobsters' removal may significantly affect the trophic structure (food web) of a reef.

continued on page 97

A full-page background image of a tropical sunset. The sun is a bright, glowing orb in the upper center, casting a long, shimmering path of light across the dark, rippling water. In the distance, a small boat is silhouetted against the horizon line. The sky is a deep, dark orange, and the water reflects the sun's light in a series of bright, shimmering points.

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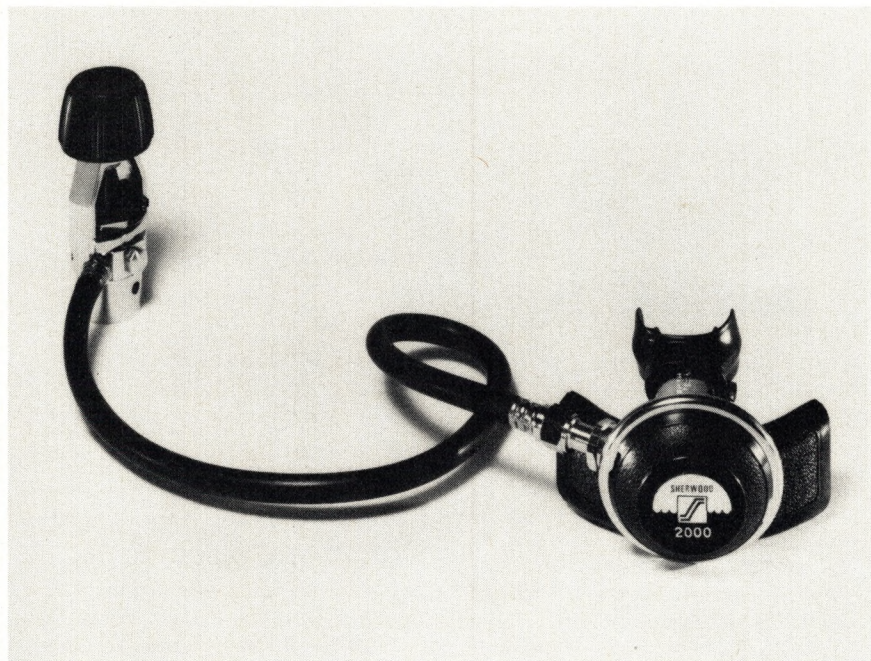
Subscribe today . . . and *escape!*

The Nikonos Power Pac is a small connector system incorporating a 22½ volt battery/capacitor. The Power Pac is used to trigger the Solid State Triggering device (SST) in the new Ikelite Strobe housing. Can also be used to power flash cubes or flashbulbs. Ikelite Underwater 3301 N. Illinois St., Indianapolis, Ind 46208



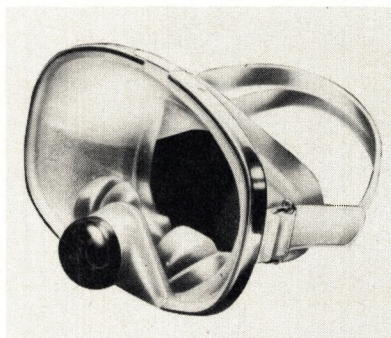
NEW FOR 77

Sherwood Selpac has introduced a new regulator, Model SRB 2000 for 3000 psi service. Suited for use in rental service or recreational diving, the first stage is an uncomplicated design based on a large diameter piston for quick breathing response. It also features a heavy duty swivel yoke, three low pressure ports and one high pressure port with safety orifice to prevent hose whip. Piston type regulators are known as one of the safest designs on the market. Only one moving part, the piston, means less wear and longer life. Sherwood Selpac, a Hill Acme Company, 120 Church Street, Lockport, New York 14094



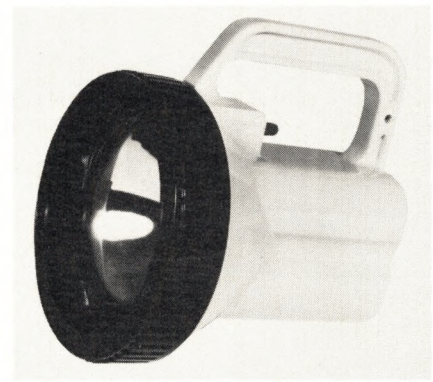
Super Clear is one of the finest, longest-lasting, to-the-very-edge-of-the-mask defoggers available. Supplied in a 5½ oz pump bottle. A few pumps last all day. Aqua-Craft, 3280 Kurtz St., San Diego, Ca 92210

With the Scubapro H/T Mask, "tunnel vision" is eliminated as available light enters from all sides. Soft and pliable, the H/T seals perfectly to most any face, even for divers sporting a heavy moustache. Constructed of an innovative compound, the H/T Hypoallergenic/Translucent mask reduces incidence of allergies due to sensitivity to rubber or neoprene. Scubapro, 3105 E. Harcourt, Compton Ca 90221

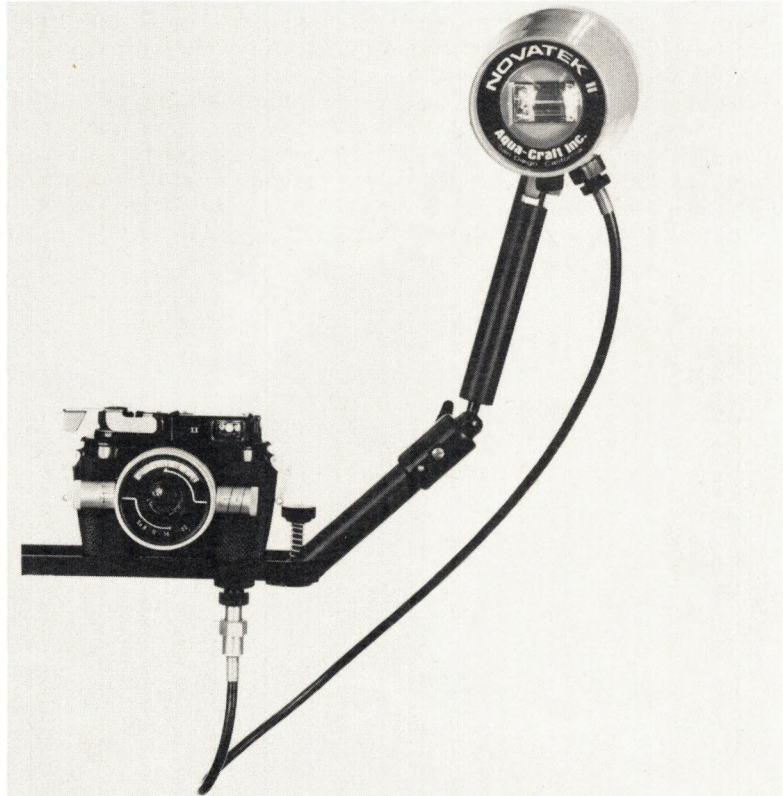


Stebco's new model 49BC3 buoyancy compensator features 3 methods of inflation: low pressure auto-inflator, oral, and Co2. The large hose is soft and contains a built in pressure relief valve. Stebco Industries, 1020 W. 40th St., Chicago Ill 60609

IT'S BETTER TO LIGHT ONE CANDLE...but sometimes you need a lot more. For those times there's Brite Lite. Its rated output of 103,000 candlepower, combined with a parabolic curve on the lens, makes it one of the most intense dive lights available. Rechargeable power-pac gives an hour and 45 minutes per charge, can be recharged on either 115 volt ac or 12 volt dc. Rugged ABS body, Brite Lite has end-of charge indicator and an oversize handle. U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, Ca 92702



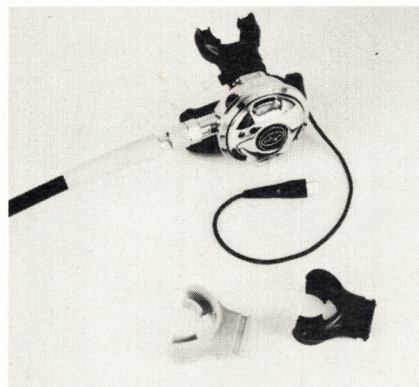
Scubapro's buoyancy compensator, a proven workhorse, now available in black and orange. 35 pounds of positive lift. Scubapro, 105 E. Harcourt, Compton, Ca 90221



NOVATEK UNDERWATER STROBE ARM S-73 (with Nikonos baseplate). This 12 inch strobe arm will put your Novatek strobe anywhere you want it. Arm has 360 degree mobility, is solid anodized aluminum, and will mount on either a Nikonos or a camera housing. Aqua-Craft, 3280 Kurtz St., San Diego, Ca 92110

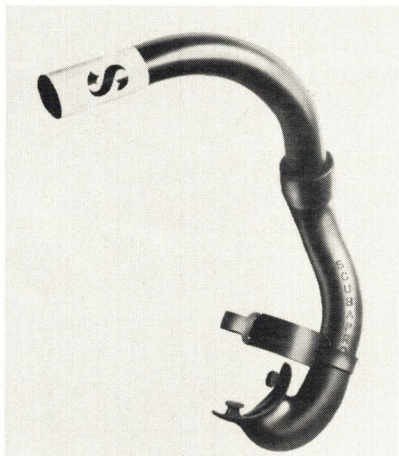
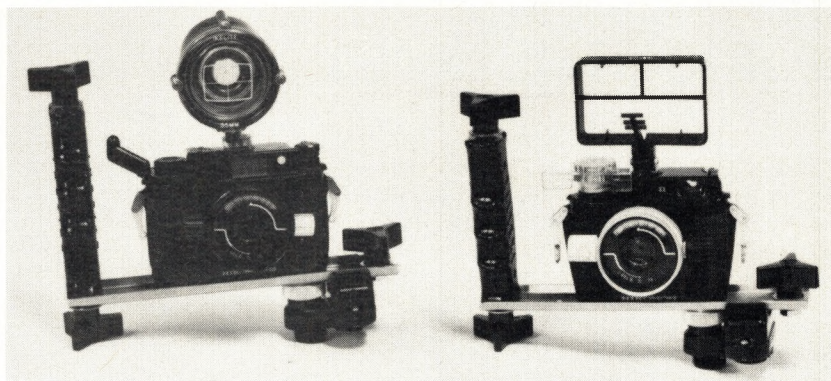


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GET A GOOD GRIP ON IT.....
New Ikelite grips have been re-designed to give maximum handling comfort with the Nikonos, including the Nikonos III. Hand-shaped grip includes the new SST power-pac trigger system. Ikelite, 3301 N. Illinois St., Indianapolis, Ind 46208



The Swivel Tip Jet Snorkel allows freedom of tube positioning with regards to facial structures. Designed for back surface swimming with back mounted BC's. Scubapro, 3105 E. Harcourt, Compton, Ca 90221



AND FOR AN EVEN BETTER VIEW
Dacor's See-Rite offers 20 per cent more side visibility. Specially designed for wider faces, the mask is available with or without purge valve. Dacor Corp., 161 Northfield Rd., Northfield, Ill 60093



New Dacor Seachute compensator vest comes with one 16 gram Co2 cartridge and is available in orange or black. Dacor Corp., 161 Northfield Rd., Northfield, Ill 60093



All new Super Sea-Vue psi gauges feature easy-to-read luminous dial, "O" ring seal, and all brass chrome-plated housing. Redesigned raised lip bezel helps protect the lens from dings and scratches. 3500 psi service pressure. Super Sea-Vue is also available in a rubber protective coat. Sportsways 2050 Laura Ave., Huntington Park, Ca 90255

continued on page 34

DIVE HISTORIC HARBOUR ISLAND

con't from page 17

While the wind and waves are calm, this shallow reef around the Train Wreck becomes an exciting area for the underwater photographer.

Another exciting facet of Harbour Island is its colorful history. The island's first settlers were of the original group known as the Eleutheran Adventurers, who established one of the earliest settlements in the Bahamas on the neighboring island of Eleuthera. Disputes within that settlement ultimately led to the founding of Harbour Island's only town: Dunmore Town. Named in honor of Lord Dunmore, governor of the Bahamas from 1786 to 1797, this settlement of 1200 is still unofficially regarded as the first capitol of the Bahamas, mainly because the governor spent most of his time in office on this island instead of Nassau. For years Dunmore Town was also one of the largest manufacturers of sailing ships in the Western Hemisphere. Highly respected throughout the world, they unfortunately ceased production, giving way to the growth of the modern ship. Along with the island's history, there are a variety of natural scenic

areas that add to the enjoyment of visitors. Only ten minutes from Dunmore Town, on nearby Eleuthera Island are a number of dry caves, one of which is the well known Preacher's Cave. With experienced native guides, amateur cave explorers are safely escorted through the maze of tunnels and caverns where numerous vertical shafts spiral to the surface, lighting the interior of the stalactite filled room.

Just south of Harbour Island, on the Atlantic side, is the breathtaking view known as the "Glass Window", a narrow gap cut into the island where the modern concrete bridge has replaced the natural arch that was destroyed some years ago by a violent storm. The most striking view of the picturesque monument is the colorful contrast between the deep blue ocean and the pale green shoal waters of the shallow west side, made all the more impressive by the crashing of massive waves as they surge onto the rocks of the steep-cliffed coastline.

Like most out-island resorts, the Ramora Bay Club is a complete resort, with clean accommodations available for a

single or an entire family. A restaurant with a quiet, breezy atmosphere and an outstanding chef, and for the diver, a small but complete dive shop.

As all things must be, the day to return home comes sooner than desired. You find yourself loading onto the taxi boat for the short trip across the bay towards the airport on North Eleuthera, and with that you carry home an experience of serenity and excitement that will dominate your thoughts for months to come.

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by Don McGrew



SUPERBOAT

There may be a few active divers around who are not yet aware of the *SPIRIT OF ADVENTURE*: however, most of you have at least heard about this West Coast diving phenomenon. Modestly referred to as the Superboat during planning and construction; she was recently christened *SPIRIT OF ADVENTURE* following a nationwide contest sponsored by Pacific Sportdiving Company. The thing that makes this boat unique is that it was planned and constructed from the bottom up as a live-aboard diving cruise boat.

It all started about three years ago. Two West Coast dive buddies were returning home from an otherwise spectacular day of diving. Their only misgiving was the slow trip home aboard one of the many cold, uncomfortable boats of uncertain age and origin that have been converted for use as diveboats. Their conversation that day got around to the luxury and comfort that ski lodges and chair lifts provide for enthusiasts of another popular and rigorous sport.

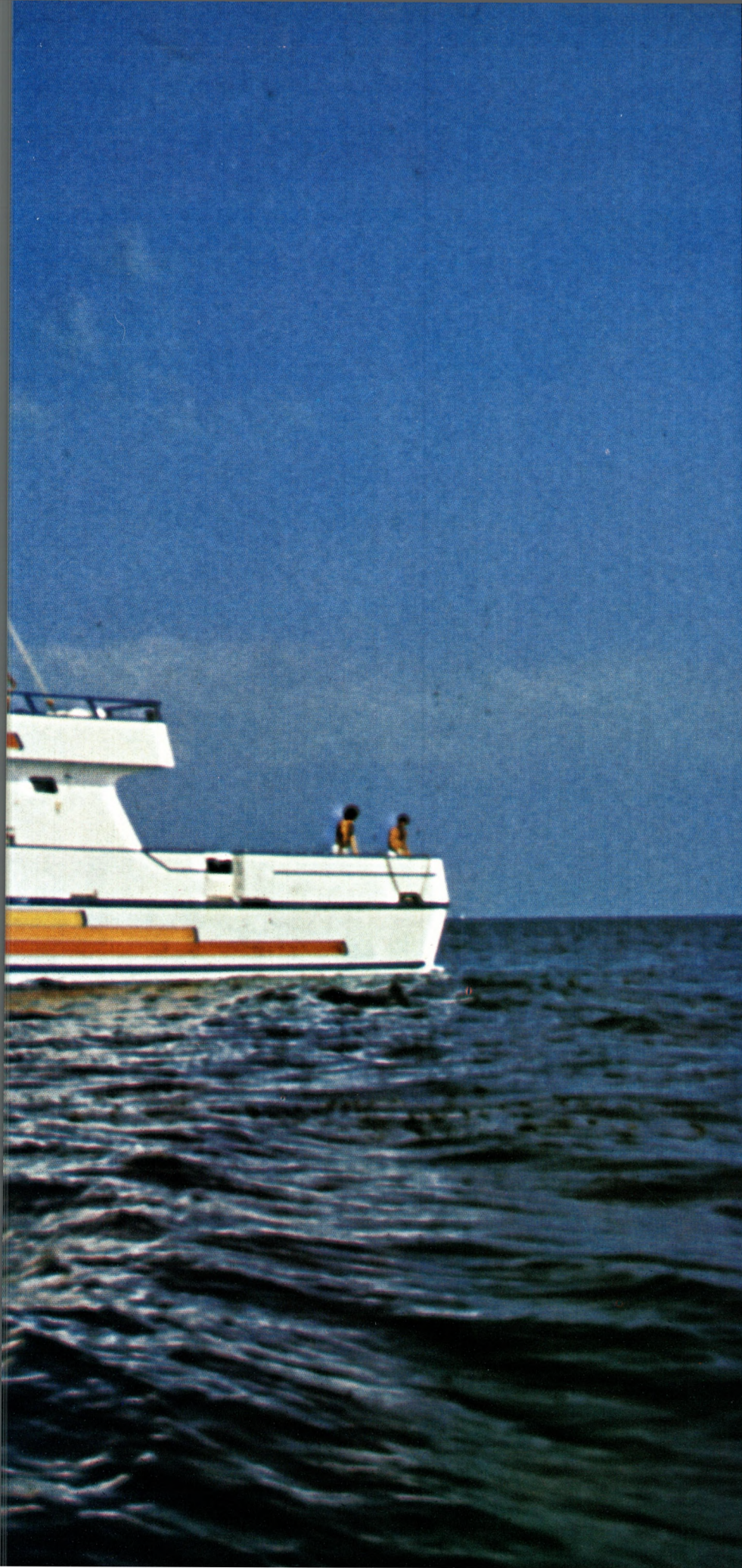
While I am sure many divers before them have discussed the same thing these two gradually convinced themselves that recreational scuba divers deserved and would patronize a luxury dive boat the same way skiers flocked to luxurious ski lodges. They even had thoughts of

getting rich quick by being the first to exploit this great idea. After all, diving has a lot more to offer than just sliding downhill in the cold snow.

They started to put their dream into action and it quickly became evident that they needed to know more about other recreational divers and their attitudes toward their sport. Without this kind of information, all they really had to go on was their own experience. It was also evident that the area where the boat would operate had to be decided before construction planning could begin. Space on a boat is always at a premium and even if this were not so, unlimited construction money to pay for unnecessary or only marginally useful things was not available. How much air-conditioning or heating to provide; staterooms or open berthing; how much fresh water; these and a thousand other questions demanded answers.

Long before a builder was selected and construction plans drafted, a substantial amount of money and time was spent on a professional survey of recreational scuba divers. The two also compiled all of the traditional wisdom that was available from instructors, dive boat operators, travel agents, dive shop owners, and others who had special knowledge of the diving industry. What at first had seemed an easy decision had become a tremendously complex task.

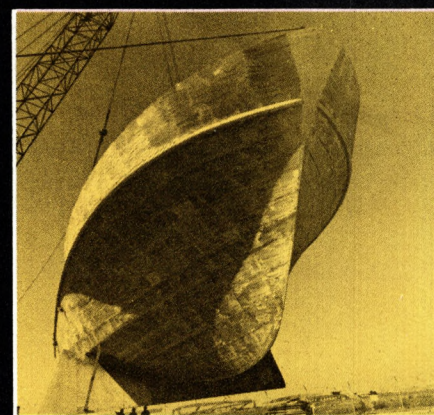




It was inevitable that many of the "good ideas" that were turned up in this extensive research were not compatible with one another. If the fares of these luxury cruises were to be kept within the price range indicated by the survey, then the amount of money which could be spent on construction was correspondingly limited. Also, if all the gadgets and the diver conveniences which were suggested had been built into the boat it would have sunk under its own weight. Tough decisions had to be made. Seaworthiness and passenger safety were, of course, absolutely essential. Comfort and luxury were the very heart of the concept and special facilities for diver convenience, highly desirable.

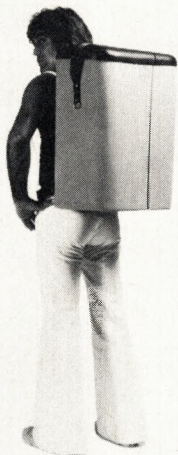
Hawaii was finally selected as the area of operation. This meant the boat had to be fast, big enough for the sometimes rough channel crossings and designed for open ocean operation in the mid-Pacific. A lot of air-conditioning would be needed, and since the passengers would be vacationers living aboard the boat during their stay in the islands, staterooms with privacy seemed to be indicated.

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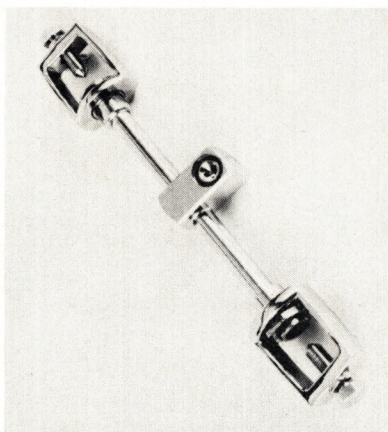


The Spirit of Adventure was designed and built as a dive boat from the bottom up. Consequently she has many special features which make diving easier and more pleasureable.

NEW FOR 77



STICK IT...in Scubapro's Carry-All. The unit has room for almost everything, and guarantees a safe, dry trip for your goodies. Rigid shell is watertight and impact resistant. Scubapro, 3105 E. Harcourt, Compton, Ca 90221



Combine 3000 psi service single tanks to make an instant double tank system. Constructed of stainless steel, the unit will fit all standard tanks. Dacor Corp., 161 Northfield Rd., Northfield, Ill 60093

SEAQUEST BC now fits any model backpack on the market. Has a velcro scuff band that prevents backpack chafing, and secures BC and regulator during transport. Puncture resistant urethane coated inner bladder with low pressure inflator. Available in black with blue gusset or yellow with black gusset. Seaquest Inc., 722 Genevieve St., Solana Beach, Ca 92705



The Bella Mask offers low volume double feather-edge seal, built in equalizer with yellow trim. Constructed of non-deteriorating rubber, which is impervious to ozone and sunlight. Tempered glass lens gives excellent visibility, stainless steel rims and buckles. Fully adjustable, split head straps for comfort. One year limited warranty. U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, Ca 92702



YOUR LIFE DEPENDS ON YOUR AIR SUPPLY...what happens if your tank runs dry, valve clogs or freezes, or regulator malfunctions. A safe diver switches to his pony bottle and calmly heads for the surface. PONI Bottle by DEW Inc., 59-22 Kissena Blvd., Flushing, NY 11355 1-800-221-0770

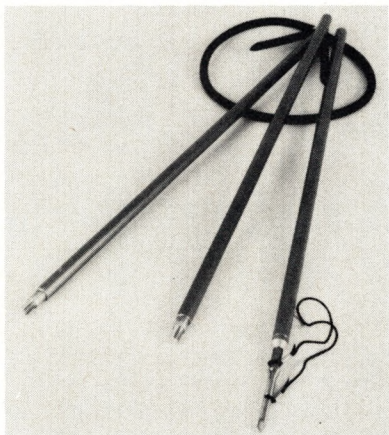
Sherwood Selpac's new 3000 psi pony cylinder, Model 1500P, can be plus filled to 15.5 cubic feet. Designed for redundant diving systems, the cylinders are painted safety orange and offer wreck and cave divers the safety margin they need. Measuring only 13-13/16 inches long, with a 4.03 inch o.d., the cylinders have a 1/2-14 inch neck thread and can be used with a KVB-6535X1-48 post-type valve. Sherwood Selpac, A Hill Acme Company, 120 Church St., Lockport, NY 14904



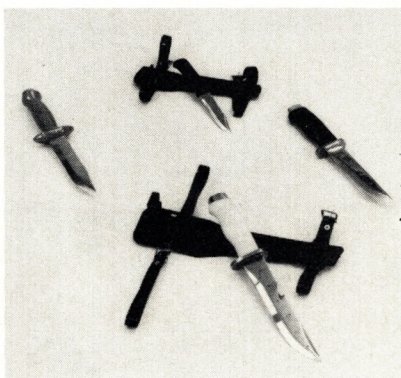
The Novatek Viewfinder incorporates fine optics, a sturdy housing, vertical adjustment for parallax correction, and two field of view masks. Easily secured to a Nikonos. Aqua-Craft Inc., 3280 Kurtz St., San Diego Ca 92110



The innovative Calypso compensator allows positive turning movement to float a diver in a vertical position. The unit is attached to the backpack, eliminating extra straps. Five point quick-release buckles allow instant removal of tank, backpack, and compensator. U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, Ca 92702.



Three piece spear designed for easy action, minimum water resistance and maximum strike power. Sturdy corrosion resistant aluminum and detachable spearheads. Dacor Corp. 161 Northfield Rd., Northfield III 60093



From Aqua Craft... The perfect knife for every diver. These high grade stainless steel knives come in all sizes from 4" blade to 7" blade. Handles are plastic or textured rubber for a sure grip in slippery situations. Sheaths are low profile with adjustable straps. Aqua-Craft, 3280 Kurtz St., San Diego CA 92110

NEW FOR 77



SKINTIGHT...The Capri II offers wraparound comfort for your whole body. Made of a special two-way stretch nylon. Seams are lock stitched bottoms are waist high with hip zipper. Sizes XS-XL. U.S. Divers Co. 3323 W. Warner Ave., Santa Ana, Ca 92702

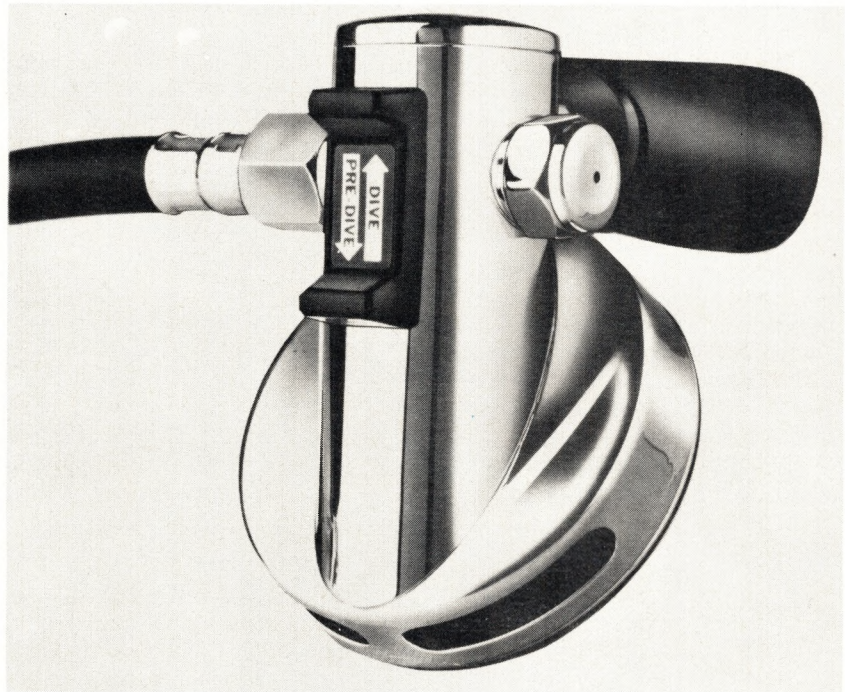


The Sea Way Fast-load is the ultimate defensive weapon. Available in hand held or tank mount model, its made of stainless steel and anodized aluminum, and has no moving parts. Can be immediately loaded and reloaded in stress situations. Aqua-Craft Inc., 3280 Kurtz St., San Diego, Ca 92110

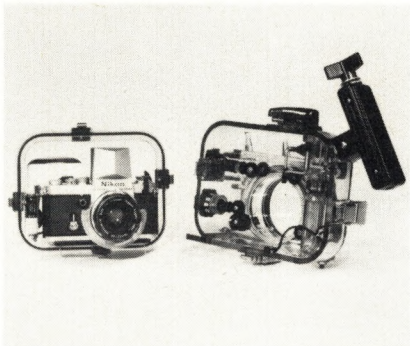
There you are after an exhilarating and exhausting dive, ready to load up and head for home. You move the gear up to the car, reach for your keys and...HOLY FISH FOOD, THEIR GONE! If you've ever lost or misplaced your keys, take a look at the Belt Pocket. It can be worn directly on the dive suit or inside a Farmer John jacket. Dacor Corp., 161 Northfield Rd., Northfield, Ill. 60093.



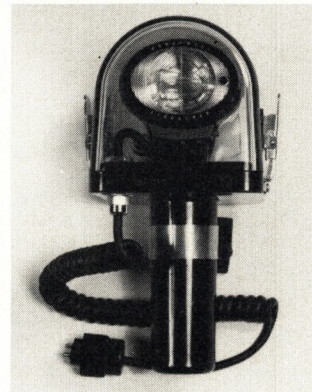
SCUBAPRO PILOT REGULATORS are the only regulators with servo operated second stage. A whole new concept, the Pilot's pneumatically amplified second stage allows natural, automatic breathing. Pre-dive switch prevents free-flowing during surface swimming. The Pilot can be used with any first stage. Dual inlet ports give choice of connection: right or left handed, octopus rig, or double with two first stages. Sturdy chrome-plated brass, weighs just 10 ozs. Scubapro 3105 E. Harcourt, Compton, Ca 90221



FLOATER POLICY...the Aqua-Master BC is an economical compensator that has all the features an experienced diver looks for. Thirty pounds of lift, overpressure relief valve, and oral inflator. The Aqua-Master is made of a heavy nylon fabric, and is available in yellow or black. U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, Ca 92702



The new 1977 Ikelite SLR cases feature effortless positive gear drive, a newly designed back to withstand greater pressure, and flash bulkheads located in the back. Both the SLR cases and the cases for Honeywell strobes (right) are transparent, allowing constant visual check for water leakage. Ikelite, 3301 N. Illinois St., Indianapolis, Ind 46208



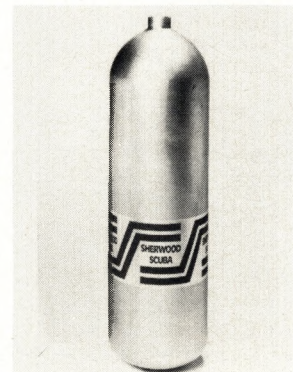
Regulator Bag, cylindrical in design, sports the Aqua-Lung logo and can accommodate regulator, CPG gauge, and depth gauge. U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, Ca 92702

Seaqwest B/C Pack now fits any model backpack available. Velcro scuff band prevents backpack chaffing and secures BC and regulator hoses during transport. With an all new puncture resistant urethane coated nylon inner bladder, the unit is available in black with blue gusset or yellow with black gusset and low pressure inflation. Seaquest, Inc., 722 Genevieve St., Solana Beach, Ca 92075

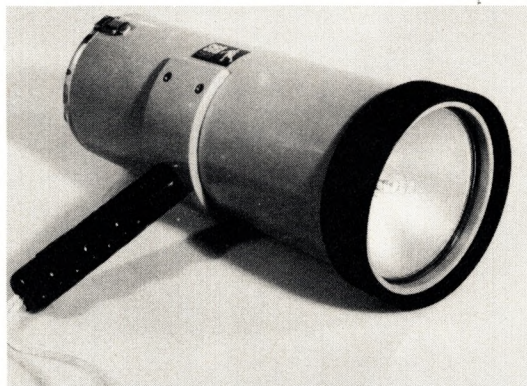


Pressure/Depth gauge console with protective cover. Dacor Corp., Inc. 161 Northfield Rd. Northfield, Ill. 60093.

Sherwood Selpac has introduced a new 3000 psi breathing air cylinder, Model 9600S, designed for the diver who needs more time down under. The 6½ inch o.d. galvanized steel unit fits any standard backpack, and take more abuse than a 3000 psi aluminum cylinder. The unit is 25 inches long with walls 0.212 inches thick, and can be plus filled to 94.6 cubic feet. Sherwood Selpac, a Hill Acme Company, 120 Church Street, Lockport, NY 14904

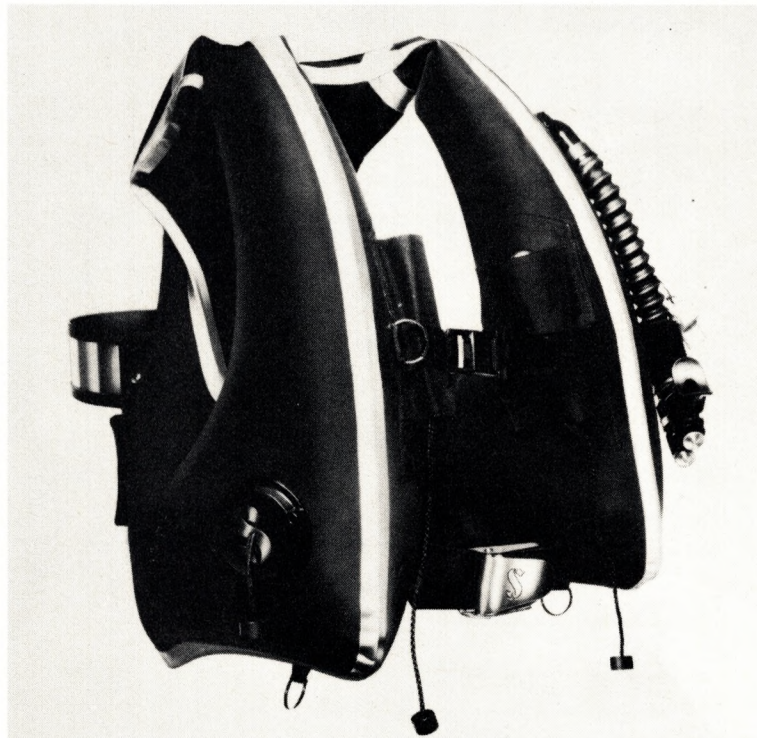


The SEASTROBE K is one of the most powerful strobes with self-contained power supply available to the underwater photographer. The SEASTROBE K features wide-angle light pattern with 100 w/s or 200 w/s output at the flip of a switch. A single connector is utilized for synchronization and serves as the charging port. A sensitive detector allows slave operation without the need for long inter-connecting cables. The SEASTROBE K is housed in a precision machined polyvinyl chloride housing with heavy acrylic light port and closure. SEA Research & Development, Inc., 1221 Peppertree Drive, Sarasota, Florida 33581



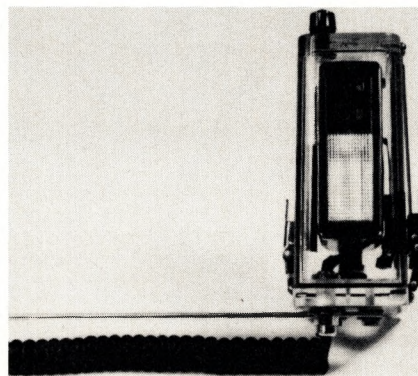
IF YOU LOST IT: the Mark 7 can help you get it back. Designed to be used from a boat it works well in salt or fresh water. Intended to locate large masses of metal (cannon, anchors, battleships etc.) it can also detect small groups of coins. Highly portable, it consists of a large search coil and a control box connected by 150 feet of cable. J.W. Fishers Mfg. Co. Anthony St., Taunton, Mass 02780

The Scubapro Stabilizing Jacket offers new dimension in underwater suspension. Its balanced buoyancy orients your body in a normal head-up fashion to provide stability for maintaining or changing positions. On the surface, you ride high and dry. Dump valve can be activated for rapid deflation, and a single quick release buckle is all that's needed for donning or doffing the unit. Scubapro, 3105 E. Harcourt, Compton, Ca 90221



Required by law in many states, the inflatable Diver's Float is rugged and compact for easy storage. Dacor Corp., 161 Northfield Rd., Northfield Ill 60093

All IKELITE strobe housings for 1977 will feature a SOLID STATE TRIGGERING (SST) device. The SST will be powered by a 22½ volt battery/capacitor located in our camera housings or in our new NIKONOS POWER PAC. The 22½ volt B/C power supply provides a dependable voltage to the SST device in the strobe housing. The B/C power supply produces ten times the power required to trigger the SST device, insuring dependable firing, even through long connecting cords in a wet environment. Ikelite, 3301 N. Illinois St. Indianapolis, Ind. 46208.



THE EDIBLE SEA

by Paul J. Hill

Lobster: Treasure of the Sea.

You might guess the treasures of the sea are such things as golden doubloons and other precious items from treasure chests of sunken Spanish armadas, but the real treasure is the ugly, bug-eyed, spider-legged lobster. This creature has such a delicious flavor when properly prepared and dipped into real butter that some people are moved to tears when it reaches their sensitive taste buds.

The lobster is indisputably the prize of the sea to both East and West Coast sport divers. This most sought after of all crustaceans, lovingly called a "bug" by divers, is commonly referred to as the California spiny lobster or rock lobster, the Florida crayfish, and the American or New England lobster.

The mother lode of Southern California waters is the golden spiny lobster, *Panulirus interruptus*. The taking of lobsters in this area is restricted to the fall and winter seasons for both commercial fishermen and sport divers. When lobster season opens the first Wednesday in October, there's a change in the atmosphere of diving. Friendly divers who went on summer fun dives together suddenly become cold, calculating, serious competitors. They display attitudes reminiscent of the early gold rush prospectors; apparently in a hypnotic trance.

These obsessed divers roll out of a snug bed on a chill night, drive to the dock, crawl into a cold bunk aboard a dripping, fog-drenched boat, and actually try to sleep to the sound of noisy diesel engines. Arriving at some remote island, the noise of the



anchor rattling over the bow signals dive time. During the coldest hour of the morning, these zombies jump out of their now nicely warmed sacks, strip down to their bathing suits, slip into ice cold wet suits, and jump over the side like herds of lemmings into a cold, ominously dark ocean. Into the depths they go, poking, prying, peering from rock to rock and reef to reef, looking for the tapered lobster antennae. They see nothing else on the way and feel nothing while jabbing their fists into holes where certain dangers lurk: the needle-like teeth of a frightened moray eel, sharp sea urchin spines, or cutting barnacles and coral growth.

The picture is the same in any area where it is possible to bring diver

and lobster together in the same place at the same time. In the area from Maine to North Carolina, the gem of the ocean is the clawed lobster, *Homarus americanus*. Bug fever starts in this area some time in the spring when weather conditions are favorable for diving. In New England states, this lobster is king and no clawless substitutes are recognized. Lobsters have always been a part of one of the oldest and most cherished of New England customs -- the clambake. Lobsters are often wrapped in seaweed and buried in a pit with other delicacies and hot stones, then served to eager guests when done.

The lobster of Maine is a very valuable resource and, therefore, a very serious business. Lobstering is

restricted to commercial fishermen. Sport divers in Maine are not permitted to take lobsters -- and lobster pirates are dealt with in a deadly serious manner by commercial fishermen. Lobster grabbing is permitted, however, in other states.

There have even been small battles with other countries for this delectable treasure of the seas. An incident occurred in the spring of 1971 when lobstermen in the Atlantic off the coast of New England complained that Russian trawlers, given permission to come within the three-mile limit, repaid the courtesy by cutting across the lobster lines and hauling in the gear. When protests were to no avail, the

angry lobstermen threatened to hire a gunboat of their own to protect their property and industry. The battle ended in 1974 when Congress declared the New England clawed lobsters creatures of the continental shelf, and foreign vessels were prohibited from taking them.

The resolution of this particular battle over the New England lobster actually caused a new battle in Florida and the Bahamas. The Florida spiny lobster, *Panulirus argus*, was the prize of this battle. It all started when the Bahamian Government followed the U.S. lead and also declared the spiny lobster a creature of the continental shelf. The U.S. law was copied

verbatim and prohibited foreign lobster fishermen, including Florida lobstermen, from taking Bahama lobsters.

As a result of the Bahamian law, Florida lobstermen who formerly worked the Bahamas moved into the Florida Keys. Lobster traps are now set so thick (five feet apart) that they present a navigational hazard. Boats tangle in rap lines and foul propellers, break lines, and cause lost or damaged traps. Boat owners become angry and frustrated, lobstermen get vehement. Fights are common, and shootings have been reported.

The traps are so thick it is impossible for a sport diver to avoid



them. Also, the danger of a diver being accused of trap-robbing is ever present. Divers have been threatened and fights have occurred, and there is the possibility of getting shot. Who would ever suspect that the complaints of New England lobstermen would result in open season on Florida bug divers? It happens.

Another battle that is constantly in session is the one regarding lobster names. New Englanders usually call the spiny lobster a crayfish and it is a "crawd" during an argument. However, "rock lobster" is catching on in New England. There are no crayfish, crawfish, or crawdads in Southern California and a native may be insulted if

his hard won treasure is referred to as one of these.

Actually, the terms crayfish and crawfish pertain more particularly to fresh water crustaceans related to clawed lobsters. The regional use of "lobster" and "crayfish" expresses a recognized relationship between the Northern and Southern animals but it is confusing, nevertheless.

The spiny lobster, being from another family (tribe Palinura), is not closely related to either the crayfish or the clawed lobster. Actually, the fresh water crayfish is very closely related to the clawed lobster of New England. Both belong to the same tribe (Astacura) and are similar in detail, but the crayfish is

much smaller. However, there are crayfish in Australia that grow up to two feet long and weigh eight to nine pounds. These are much sought after because of their excellent eating qualities. In Australia, the clawed variety is a crayfish and the clawless one is a rock lobster. The term "crayfish" was used for the spiny lobster in Western Australia until they officially changed the name to "rock lobster" to minimize export confusion. The most interesting aspect of the battle of the names is that the clawed lobster, so closely related to the crayfish, is never referred to as a crayfish.

A new diver and the traveling diver after bugs should certainly know the difference between the spiny lobster and the clawed lobster. These differences necessitate variances in methods of catching and cooking them. Conservation practices, however, are similar even though game laws are different.

Spiny Lobster

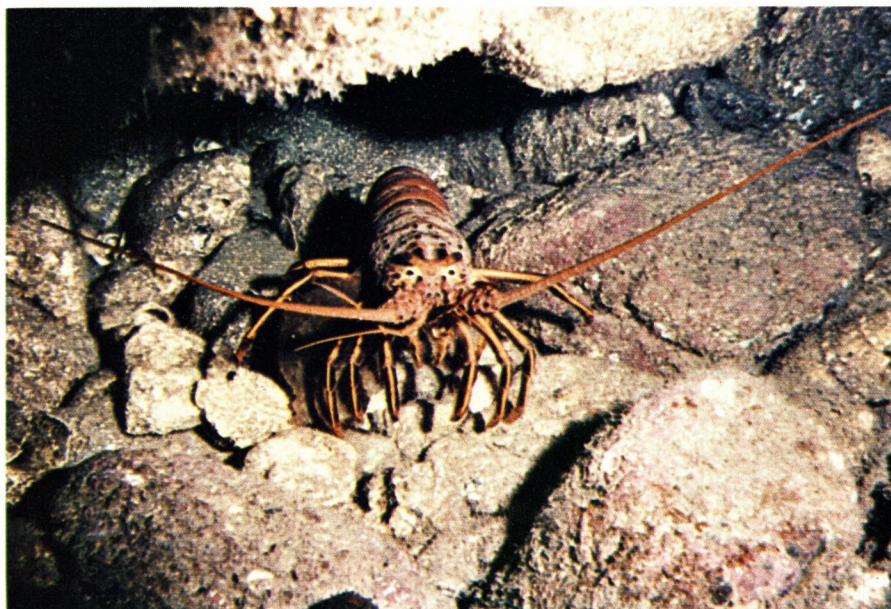
The spiny lobster can readily be distinguished from the clawed lobster by the absence of claws, the presence of many prominent spines on the body, and the very long and spiny antennae. Their fleshy tails are a highly prized seafood. The very tender boiled legs of a bull lobster (8 pounds or more) dipped into melted butter is the ultimate delicacy of the sea.

The range of the California spiny lobster extends from Point Conception to near the tip of Baja California and includes all of the offshore islands. The Florida spiny lobster lives off the Florida Keys and in the Caribbean.

The spiny lobster migrates into deeper water in the fall after spawning and molting. California spiny lobsters



In California divers are required to carry a measuring device (left) to help prevent the taking of undersized lobster.



generally mate between January and April. The female carries a sperrn packet from the time of mating until the eggs are extruded and fertilized, generally in May and June. Eggs take about ten weeks to hatch. After completing the reproductive cycle, both male and female go through the molting process.

The time required for a California lobster to reach legal size of 3.25 inches carapace length is about ten years for females and eleven for males. They have been known to grow to thirty pounds, but bugs up to 20 pounds are very rare. Even those over ten pounds are not considered a common sight.

Spiny lobsters share the nocturnal world of the clawed lobsters. As darkness falls, they tiptoe out of their hiding places on long, spidery legs in search of food. They are scavengers, but prefer fresh sea food such as crabs, sea urchins, fish, other lobsters, and smaller crustaceans. Lacking the crushing claw of the clawed lobsters, the spiny lobsters use their powerful jaws to crack the shells of their prey. A spiny lobster will nip away at a shell and keep at it until the flesh is reached.

Clawed Lobster

The clawed lobster is easily recognized by its large claws and smooth body. To many gourmets, it is the king of all crustaceans. This is the only lobster that can be served boiled whole at the dinner table and eaten conveniently from its shell.

The range of the American lobster extends from Cape Hatteras, North Carolina to Labrador, from near shore out to a depth of about 150 feet. They migrate into deeper waters beginning in the fall after spawning and molting. Some venture into 1000 feet or more. They are most abundant around Maine and Nova Scotia. The average commercial lobster that arrives at the market has molted about twenty-five times, weighs close to two pounds, and is six to seven years old.

The largest clawed lobster ever caught at the time of this writing weighed 44 1/2 pounds, had a body two feet long, and was caught 125 miles off New York. The Pilgrims are said to have caught and eaten lobsters up to six feet in length, but these days, a fifteen pounder is a rare giant.

When the Pilgrims first settled the New England shores, they found a dense supply of clawed lobsters, a well known creature in the Old World. Although the American lobster differed somewhat from the European species, the differences were extremely minor and probably not noticed by the settlers.

Did you know that scampi is really a lobster dish? The Italians catch a small clawed lobster (*Nephrops norvegicus*) in the Adriatic Sea which is known incorrectly in many areas as a prawn. They cook "scampi" in a savory and aromatic mixture of oil and garlic. Some

countries use shrimp for this dish -- a poor substitute for lobster.

Catching Lobsters

The equipment accessories for taking lobsters usually are an underwater light, gloves, and a lobster or game bag. Get a good light so you don't miss those in a dark hole and so you can dive at night when the lobsters are out.

Gloves are especially necessary to protect the hands when hunting lobsters. Spiny lobsters have sharp spines over the entire body, like thorns on a rose bush. The eastern bug has pinchers which will readily crush a hand or inflict a deep incision to bare, or even gloved hands.

Many experienced divers agree that more bugs can be found by covering a lot of territory, slowing down only to check out a likely hiding place. When you find long ridges, reefs, and especially crevices, follow them until they disappear. Look for white water and swells, an indication of an underwater reef that may be crawling with lobsters. Also look for large caves where you may catch your limit in one stop.

When a lobster is spotted, approach him very slowly as he can sense any unusual movement of the water and he has good eyesight. The eyes are compound like those of an insect and are designed to detect the slightest movement. Then make a quick grab for the base of the feelers or claws as if you were grabbing two five-dollar bills about to blow away, which may be the true value of your bagged bug, depending on his size and the going price of a good lobster dinner at the time.

Another popular method is to use a long pole to push the lobster out of a hole. Then grab him quickly before he escapes.

Catching Spiny Lobster

Look for the tapered antennae, usually the only thing that can be seen of a spiny lobster at the entrance to his hiding place. Make your grab at the base of the long antennae. If you grab the antennae above the base, they will break off.

The spiny lobster of California frequently shares his abode with a motley array of misfits such as moray eels, sea urchins, and scorpion fish, commonly called the sculpin. A diver hunting West Coast species follows the rule, therefore, to look sharply before grabbing! If the lobster is big enough, however, it may be worth the pain that can be inflicted by these bothersome co-residents. A diver may be confronted by the question of whether it is better to use an injured hand while eating a lobster dipped in hot butter or to eat a hamburger with unscarred, cowardly fingers.

Don't pay any attention to these cowardly feelings when you find a lobster hiding behind a sea urchin! Just imagine the five-dollar bills and grab right through

the urchin spines. Sometimes (if it's a 15-pound bug) the thrill is so intense that you won't even feel the urchin spines that stick out of your hand, making it resemble a pin cushion.

Catching Clawed Lobster

Clawed lobsters have shorter antennae than the spiny bugs, and are harder to spot. Here you have to look for the menacing claws protruding from a hole.

It is possible to grab the northern bug by the claws, but much better to grab across the carapace, or back. Grabbing a small bug by his pinchers usually gets you one of two things: instant pain, or a claw minus the rest of the bug. These lobsters will surrender a trapped claw just as the spiny lobsters let go of an antenna, and eventually grow a new appendage.

The two great advantages to grabbing eastern lobsters are the absence of sea urchins and moray eels. The joy of sticking your hand into a dark hole and feeling around for lobsters without fear of being speared or chomped on is well worth any lobster nipping you may get! North of Cape Cod in shallow water, be cautious of holed up eel-like wolf fish.

The technique for catching large northern bugs seven pounds or over is quite different than catching smaller ones. With a small bug, you grab him anywhere you can. A large one, however, requires some special planning and maneuvering. You will need a fast, good grip, and cool calculating nerve.

The most important fact to consider when attacking a large northern bug is the position of the crusher claw — it can be on the left or right side. The crusher claw is the largest and has white tooth-like mounds that look like molars lining the crusher inside edges. In comparison, the cutting claw is much narrower and very pointed at the top. There are no white tooth colorations on this claw although it does have spiny projections for cutting such things as — fingers.

If you have determined that the crusher claw is on your left side, the next step is to bait him with your right hand by moving your fingers in front of him. His first defensive move is usually to attack fingers with his crusher claw. This is where your cool, calculating nerves and good, fast grip are required. Grab the outside edge of the crusher claw with your left hand and pull it to your left. At the same time, grab the outside edge of the cutter claw with your right hand.

With both claws in your big strong hands spread as far apart as possible, exert a steady pull and a slight rotating movement to free the lobster. If you should be so unfortunate or clumsy as to be grabbed by a large claw, you can escape by rotating your arm. The

rotation will break off the claw -- he will grow another one, unless you return as victor. However, the broken claw will remain clamped to your hand for a short period of time -- a long time if you're not wearing gloves. It may hurt less if you think about how good the claw meat is.

Lobster Conservation

Lobster in many areas appear to be in danger of becoming seriously depleted like many animals subject to both sport and commercial exploitation. The cause is one of the most common and biologically serious offenses; the keeping of undersized or short lobsters by commercial and sport fishermen. This results in the killing of lobsters that have not had a chance to spawn or reproduce themselves. Also, the constant search for trophy or oversized lobsters by divers results in the depletion of big prolific spawners.

If we are to preserve the interesting and delicious lobster, strict adherence to size limits must be observed. The tremendous effort expended to capture the valuable lobster should be balanced by a similar effort for conservation. Although laws have been enacted to conserve the lobster, it is only the strict observance of good conservation practices by each individual that will ensure a continuous supply of lobsters.

Even though some divers break local fish and game laws, divers have the least effect on conservation. On the average California dive boat, there are usually one or two divers out of 20 or 30 who get their limit and the rest get few, if any. The exception, of course, is when a "hot spot" is hit, but this is a rare occurrence. Commercial fishermen naturally get the biggest catches and can be the most destructive offenders. Lack of good conservation practices by commercial lobstermen can quickly annihilate the lobster population of an area.

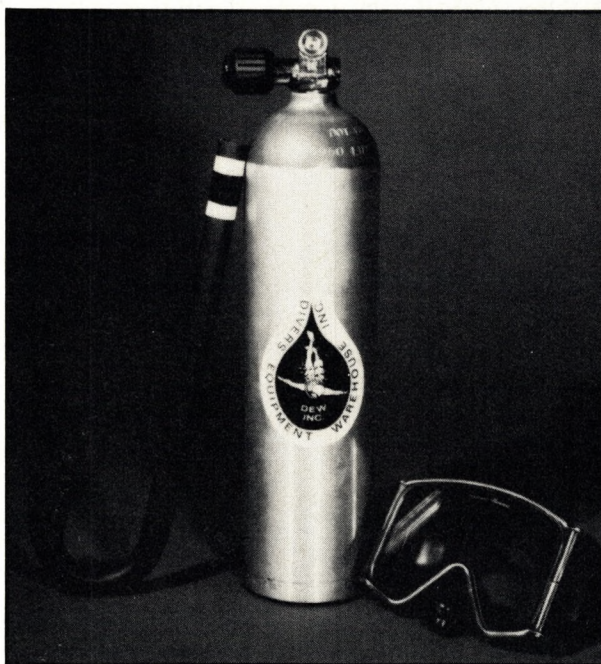
The sea itself is the greatest hazard to lobsters. The most vulnerable are the young lobsters, egg bearing females, and molting adults. Lobsters are preyed upon by octopus and large fish. The most destructive of these are the bottom feeding fishes such as skate, sheephead, and jewfish. On the East Coast the cod, skate, and dogfish destroy great numbers of lobsters.

Lobster conservation was no problem 100 years ago. The finest lobsters could be purchased at the rate of fifty cents per hundred on the East Coast. Lobsters lived in such numbers in Chaleur Bay that farmers used them by thousands to fertilize land. During recent years, however, commercial overfishing has depleted the best fishing grounds and conservation laws have been enacted which carry heavy fines.

The California Department of Fish and Game requires a fishing license

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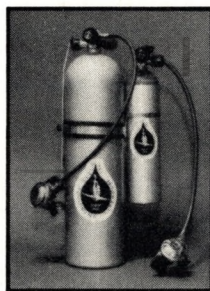
The Ultimate Safety System



Poni Bottle next to mask & snorkel to indicate small size.

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WHAT WOULD YOU DO IF: Your 1st stage jammed - Your "O" ring blows, there goes your air supply - Your 2nd stage sticks in an uncontrollable free flow, there goes your air supply - Your CPG goes off calibration and you run out of air - Your "J" valve freezes and you're out of air - Your "J" valve spring fatigues and does not hold any reserve - You're decompressing and you run out of air - One of your hoses blows, there goes your air supply - A piece of rust or crud clogs the intake of your valve, no more air - Ask any New Jersey wreck diver — Ask any Florida cave diver. Ask **ANY** diver who believes in safety. Ask any diver what good an octopus is when there is no air left in the tank!



More air than the reserve on an aluminum 80 - 100% Rust Free - Lightweight aluminum, lighter than steel - walls twice as thick as steel - Economical, long lasting - Pound for pound stronger than steel. Straight 3/4" threads for easy visual inspection and reduced thread wear. "O" ring seal means no need for teflon tape, no need for vises or wrenches to remove valve - Unlike steel cylinders, the pressure rating for aluminum cylinders does not decrease after the first hydro - For safety and visibility...available in yellow, orange, or brushed aluminum.

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ON A SLIP IN THE SEA

"The Living Reef"® words and photographs by

JERRY

and

IDAZ GREENBERG

Seahawk Press, Miami, FL

The coral reef is a splendid example of a balanced natural habitat. Sea fans, anemones and sponges fasten onto coral. Crustaceans dwell in the many nooks and recesses formed by the coral heads. Small creatures find nourishment and haven among the reef growths and in turn provide food for larger animals. Each species of coral polyp has its own typical growth and reproduction pattern, forming the various colonies that we see in the seascape. Some corals branch out into tree-like shapes, while others form convoluted boulders.

The coral reef is an ancient association of life forms that have been in existence 500 million years. Individual coral polyps are tube shaped and range in size from pinhead to one foot across. A close-up of a colony, four times life size shows the slit-like mouth opening surrounded by tentacles that extend to sting and trap food. Cells on the lower sides and bottom of the animal produce the limestone that builds islands and reefs. The fringing reef is formed by literally billions of these tiny creatures.

Coral is fed by water currents that bring it plankton, the tiny organisms suspended in seawater that sustain even great whales. Temperatures most favorable to vigorous growth range from about 75°F to 85°F. This need for warm water limits most reefs to the eastern shores of continents in the subtropic and tropic zones. Reef coral always has, living within it, small plant-like cells called zooxanthellae. Since these organisms require light in order to live, reef corals are generally found in water less than 100 feet deep.

Floating away the afternoon with the warm sun at our backs and the reef below, time ceases to exist. The soft white sand bottom reflects the light so that it shimmers round from every side. We sway with the movements of the sea that give rhythm to the seafans and gorgonians beneath us.

Parrotfish nibble daintily on the outstretched branches of coral while angelfish draw near the strange visitors. Our eyes search out the crevasses and gullies all curtained and draped with sponges and algae, red and purple, green and blue.

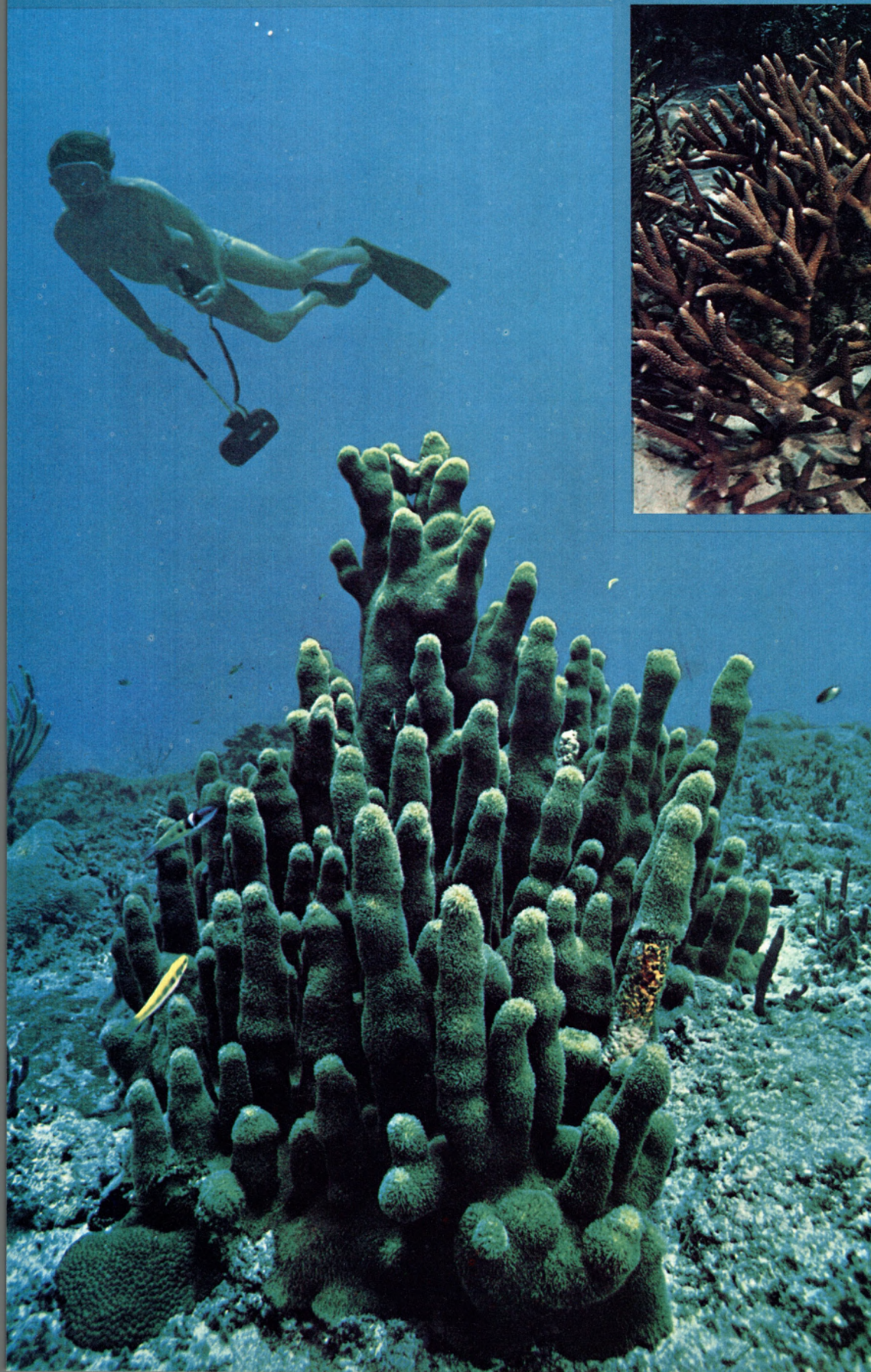
BRAIN CORALS. . Structural patterns of this coral resemble the pathways of the human brain. Unlike the brain, the only living parts are on the surface. The polyp grows outward, enlarging the colony by budding and dividing until huge boulders are formed. Coral polyps are extremely long-lived, with a life span of centuries. The smaller brain coral (*Diploria labyrinthiformes*), contrasts with the bolder convolutions of *Colpophyllia natan*.

ELKHORN CORAL. . The elkhorn coral (*Acropora palmata*) is a living diagram of the direction and strength of the currents that run through it. This master builder of the reef extends dense, palmate branches that reach a height of 6 to 10 feet. It can cover acres of ground and form true barrier reefs that stretch unbroken for miles.



PILLAR CORAL . . . Another name for *Dendrogyra cylindrus* is cathedral coral. These gothic spires are often inhabited by tiny fish with colors of stained glass. This rarely seen coral grows apart from the reef. The pillars are very sturdy, but the colony is flow-growing and does not cover a large area, which may account for its scarcity.

STAGHORN CORAL . . . Though delicate and easily broken at the tips, staghorn coral (*Acropora cervicornis*) is an important reef builder. Like its relative the elkhorn coral, staghorn forms extensive underwater growths, but does not attain as great a height.



STAR CORAL . . . Living mountains of green velvet host a multitude of creatures. Groupers, moray eels and lobsters find shelter beneath their ledges. Small fish dart about seeking food and defending their territory.

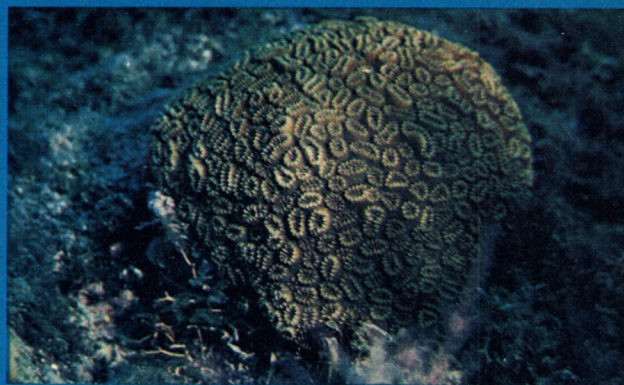
Stinging corals may grow upon star coral, along with sea fans and other gorgonians. Star coral establishes one of the most extensive colonies on the reef.

The close-up of the star coral, four times life-size, shows the polyps retracted into their stony cups. The green coloration is due to algae-like zooxanthellae living within the coral.

There are at least eight corals bearing the common name star coral, pointing up the need for scientific names to distinguish between them.

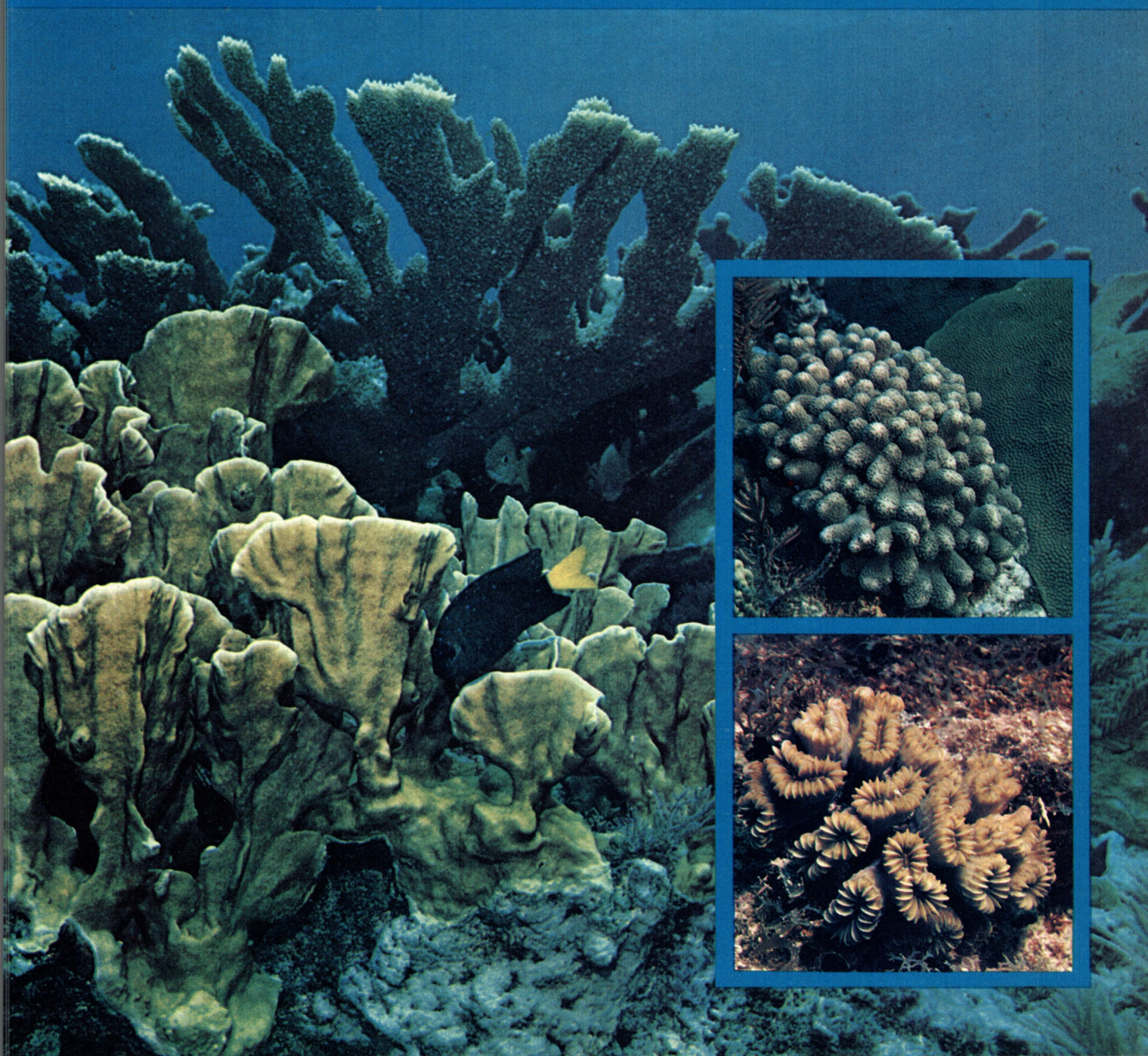
STINGING CORAL . . All corals can inflict slow-healing wounds on the diver who brushes against them, but none so painful as that caused on contact with stinging coral. *Millepora alcicornis* and *Millepora complanata* are distant relatives of the stony corals, but are in the class Hydrozoa.

The polyps are very small and do not form visible cups, giving these corals a smoother looking surface than other corals.



FINGER CORAL . . . Clubbed finger coral (*porites*) forms small colonies.

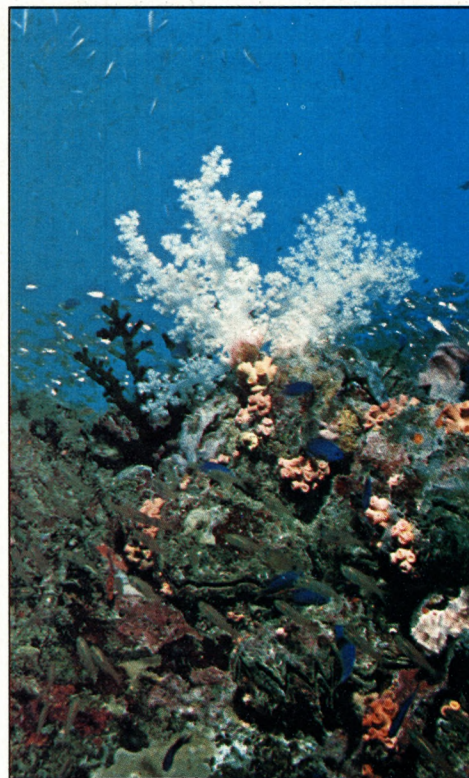
FLOWER CORAL . . . Flower coral (*Eusmilia fastigiata*) builds mounds up to 10" across.



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Photography by Don Bloye

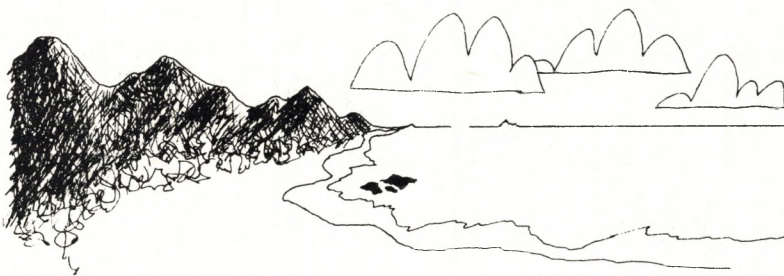
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WHERE THE DESERT MEETS THE SEA

RED SEA GALLERY



"I know from experience
that the bottom of the Red Sea
is full of surprises.
I can say, in fact, that the
happiest hours in my diving experience
have been spent there."

Jacques Yves Cousteau
Life and Death in a Coral Sea
Doubleday & Company
Copyright 1971

Story and photographs by Rick Frehsee with Sari Gains

The contrast of the
desert and reef is
most startling.

Gaze upon the crusty
mountain peaks stretch-
ing in pastel colors as far
as the eye can see, tower-
ing above moon-like
valleys where years pass
without falling rain. It
seems hostile to life, but a
few feet beyond is a
diver's world of great
corals, blazing colors,
life abundant.

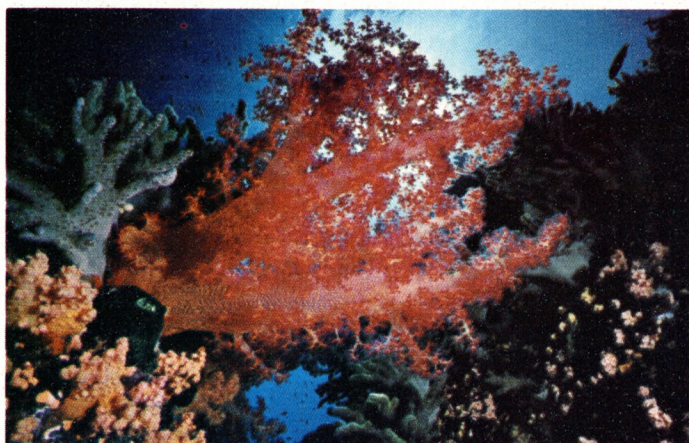
The Red Sea reef
begins at Elat, gateway
city to the Sinai beyond,
and extends virtually
unbroken for nearly 200
miles, then hairpin curves
into the Gulf of Suez.

To the north, less
than an hour's flight away
stand the golden city of
Jerusalem and the me-
tropolis of Tel Aviv. But
south, the way of the reef,
is the wilderness through
which Moses wandered,
not much changed since
that day. It is a land of
geological extremes;
jagged rock mountains
and rolling expanses of
desert...a land still pop-
ulated by Bedouin tribes
and their goat herds,
where camels follow trails
already ancient before
recorded history.

For much of the way
south, the reef closely
parallels the road. Its
corals rise within a few
feet of the surface, and
drop to white sand
bottoms or plunge, in
places, to unattainable
depths. Everywhere it is
different, but everywhere
it teems with breathtaking
life.

*The spectacular scenery
of the Cula Mountains
meeting the sea (right).*





The Sinai Reef is unique.
To those who have explored it,
it is one of the most
exceptional seascapes of this world.

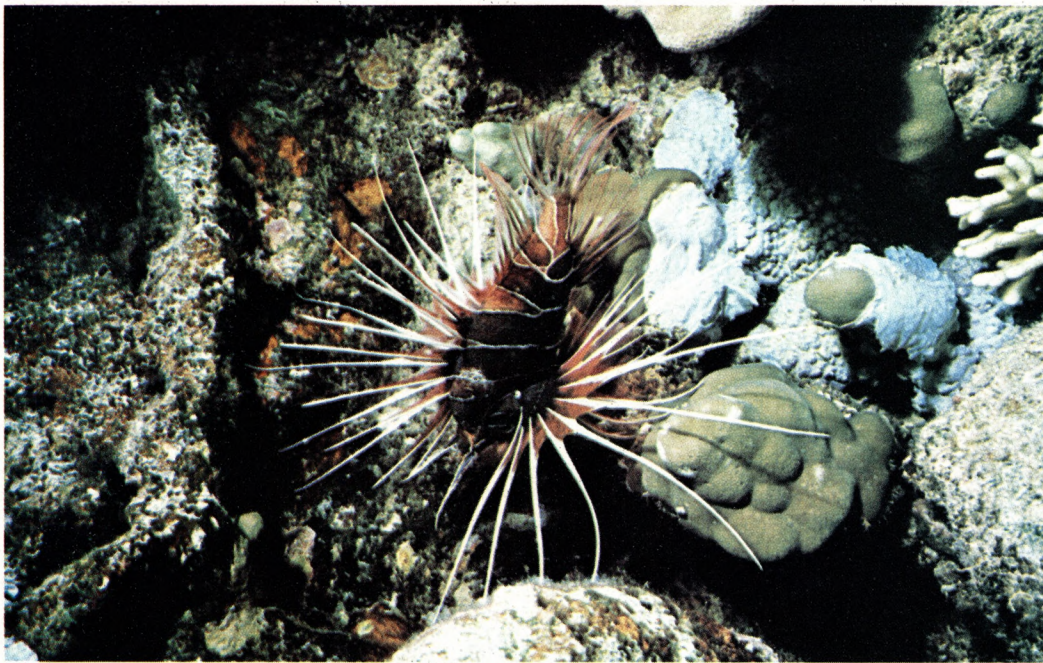
The Sinai Reef is unique; to those who have explored it, it is one of the most exceptional seascapes of this world. Filled with life forms which originated in the Indian Ocean, Red Sea life has evolved into different species, many of which are found only here.

There are great sections of this reef which no human has yet seen. The divers who began its exploration only a short time ago were distinctly adventurous, but today, experienced divemasters from the Andromeda Dive School in Old Jaffa, Tel Aviv, take visitors along the reef in safari vehicles, carrying compressors and all necessary equipment, spending nights in comfortable air conditioned quarters.

A stormy day in the Gulf of Elat is rare indeed, and it is possible to dive every day. There are seldom significant waves, currents are moderate, and tides are almost unnoticeable. Visibility is normally 100 feet plus, rarely less than 60 feet. Water temperatures range from 70 F in the winter to 80 F in the summer.

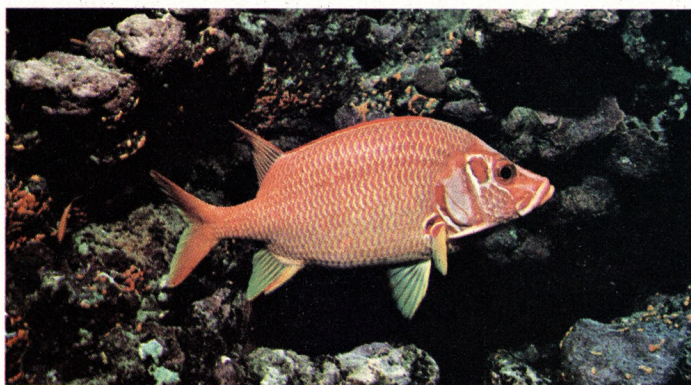
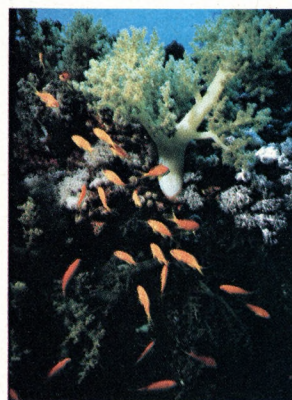
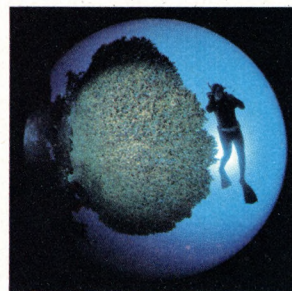
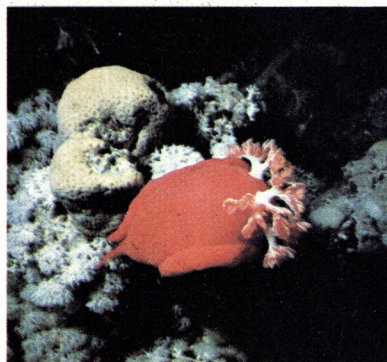
Scattered throughout the area are the unbelievable colors of the reef life (top left). Broccoli-like soft corals add to the exciting variety of the Red Sea.





Fish, hard and soft coral, and sponges of every imaginable shape and color inhabit these waters. There are more than 100 species of stoney corals, dozens of species of fluffy broccoli-like soft corals, and more than 1000 species of reef fish, some of which appear to have been put together by a drunken taxidermist. 25 species of parrot fish, 15 species of butterfly fish, 20 species of box, trunk, porcupine and puffer fish, and 20 species of flounder are known to cruise these waters.

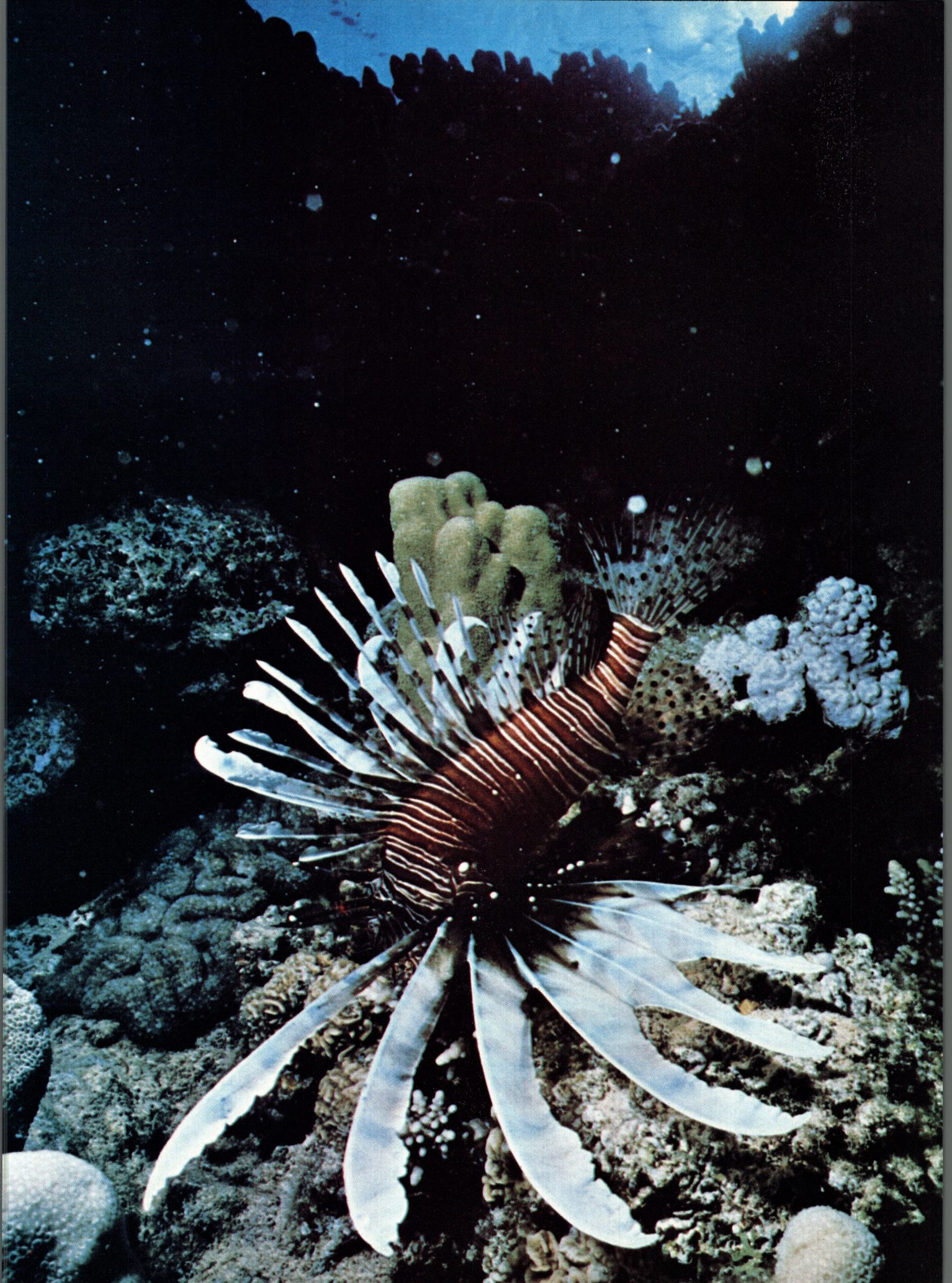
Some of the most unique and unusual fish in the world are found in the Red Sea; some as common as the grouper, others as splendid as the lion fish.



A short distance from Elat, where the Egyptian Camel Corps was once encamped, a deep blue fiord cuts into the granite cliffs. Just beyond, divers probe the waters around a small offshore island, topped with the ruins of a castle built by Crusaders in 1170 AD. It is said that this is the island to which Solomon brought the Queen of Sheba. Not far from the road are caravan ways over which spice, treasures, and slaves were moved for centuries. You can see the story of their passing etched in rock: Nabatean drawings two thousand years old, signatures of Greek slaves, Roman legionaires, and medieval knights. Remains of ancient ships have been found along the shore.

Moving south, past tribes of Bedouins and small desert oases lined with palms, sometimes over white sand beaches, or where the mountains run into the sea, everywhere is a place to dive. The old romantic names are beginning to take on special meaning to divers: Rass Abu Galum, Dahab Pass, Ras Nasrani, Sharm El Sheikh.

The lion fish moves through the corals displaying its toxic feather-like spines (right).





Palms shade the arid desert land (above). Aerial view of Rass Muhammad, at the tip of the Sinai Peninsula, from the Red Sea satellite (below right).



At the tip of the Sinai is Rass Muhammad, a place the Israelis call "the end of the world". It has been said that here one can easily talk to God. At Shark Island, Rass Muhammad, we slid across the reef on our stomachs, snorkeling over the wall. Sitting in 18 inches of water, I peered into the infinity below. The open waters are host to many varieties of jack, tuna, albacore, and manta. Dancing swords of light reveal colors that appear to be just a little more vivid here, contrasting against the deep blue. Here the unexpected happens, the unusual is the rule. Here is a place to be experienced, to be savored, to be taken into the pores of the soul and remembered for a lifetime.

Red Sea expeditions are arranged through the National YMCA Scuba Activities Center, Key West, Florida.



It has been said that here one can easily talk to God.

THE CONEY BEHATH THE SEA

THE CONEY—*CEPHALOPHOLIS FULUA*

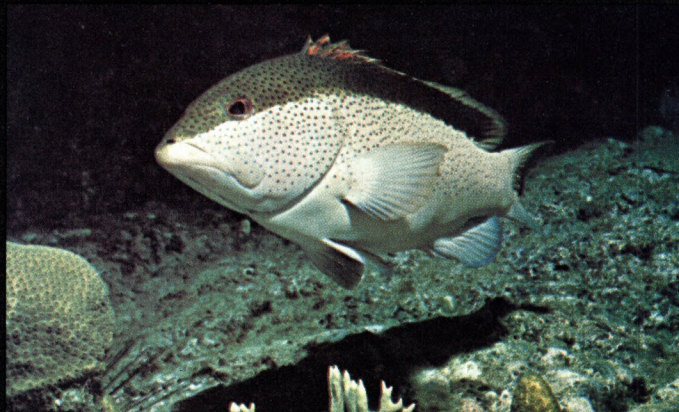
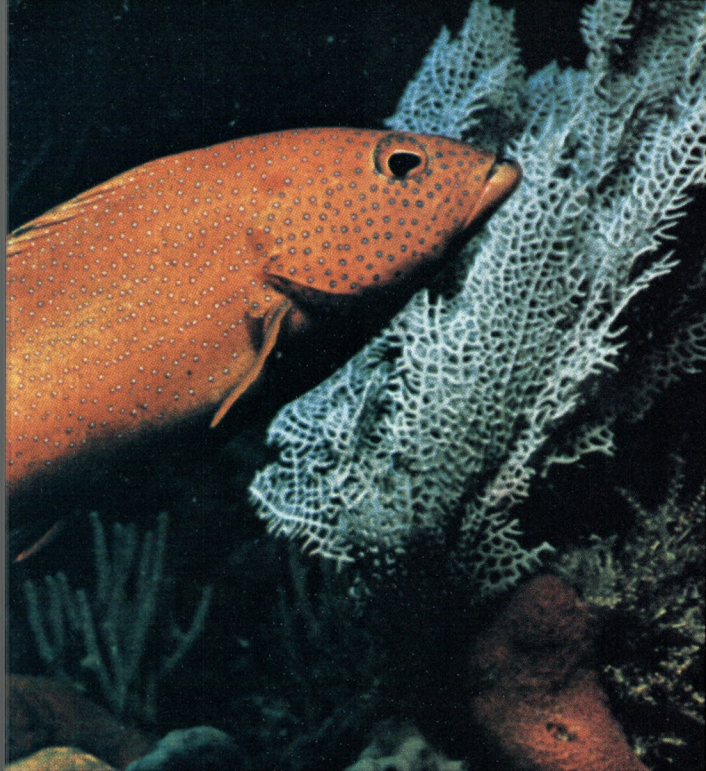
You can't always tell a fish by its color! The *Coney Cephalopholis Fulua*, is a good example. It's a small grouper reaching a maximum length of just over a foot, and like most members of the grouper family is capable of considerable color changes. The Coney exhibits the three distinct color phases shown here as well as several variations of the red-background-with-blue-spots color phase. Regardless of the color phase, the Coney can always be distinguished by the presence of two pairs of black spots. One pair of black spots is located on the back between the dorsal fin and the tail. The other pair is at the tip of the lower jaw. While photographing this species in color, changes have been observed in all but the yellow color phase.

The capacity of fish to change color is well known, but the significance of many of the color changes is poorly understood. Changes in color patterns are affected by contraction or expansion of color cells (chromatophores) which contain a variety of pigments. These cells are controlled by the nervous system with the stimulus for color change received by the eye. The ability to change color allows a fish to either camouflage or make itself conspicuous. Blending in with the environment may be an advantage to both predator and prey by allowing concealment at a critical moment. These color changes allow mimicry of other species recognition. Other behavioral color changes are associated with defense of territory and cleaning and feeding activities. Color changes also occur from day to night and with age. In order to identify a fish by its color you need to know all the color phases associated with its complex behavior as well as the changes that occur during its life cycle. It isn't as easy as it looks.

Story and Photographs

by John Larsen





Text and photographs by Ken Hafner

SHIPWRECKS: ISLE ROYALE STYLE.



The Canadian steamship "Emperor", makes her way through the frozen locks of the Soo Sainte Marie, Michigan (above). The "American", shortly after she slipped beneath the icy waters of Lake Superior, at Isle Royale (below).

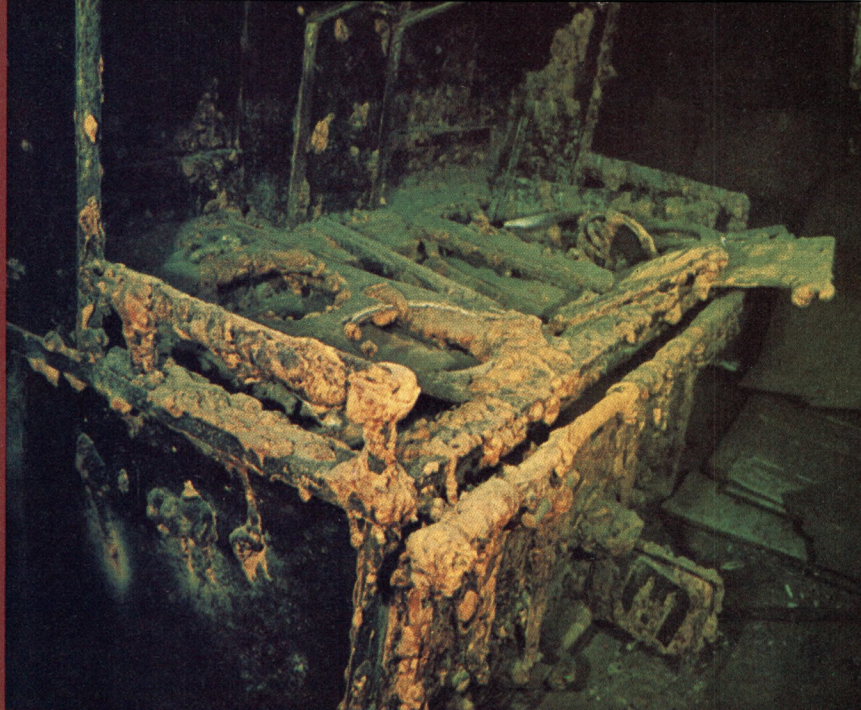
When someone mentions shipwrecks, your thoughts take you perhaps to the Andrea Doria off the New Jersey coast, to a Spanish galleon in the Florida Keys, or perhaps to the I-169 in the tropical waters of Truk Lagoon. Well, program this into your memory banks. The best preserved intact shipwrecks, free of marine growth, lie in the frigid waters of Lake Superior.

In the heart of commercial shipping lanes 35 miles due east of Thunder Bay, Ontario, lies Isle Royale. Desolate, remote, Isle Royale is 10 miles wide and 60 miles long. It's owned by the state of Michigan, and is administered by the National Park Service, which regulates all diving and camping in the area. Known for its sheer cliffs and rocky ledges, the Isle has been described as an area God forgot about. This may be true, but for the crews of the steamers "America" and "Emperor", God was very near. Let us now turn towards the fate of these two ships, learn of their past and uncover their present in the cold, 34° F. waters of Lake Superior.

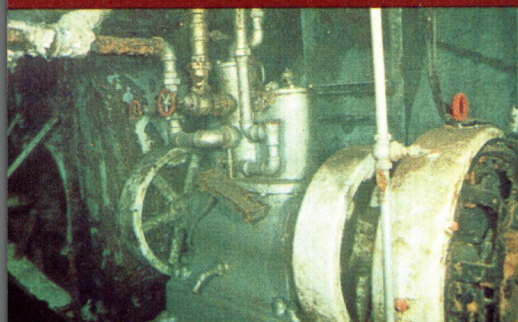
The steamer "America" was built in 1898 by the Detroit Dry Dock Company in Wyandotte, Michigan. Steel hulled with a wooden superstructure, she was originally 164 feet in length, 31 feet abeam, and 11 feet in depth, weighing in at 681 tons gross. Sold in 1903 to the U.S. Dominion Transportation Company, she serviced Duluth, Isle Royale, Port Arthur, and Fort William for the Booth Fisheries. In 1911 an 18 foot section was added to the stubby little "America", increasing her length to 182 feet, very respectable for a small packet steamer.

On Thursday June 7, 1928 the "America" left Singer Island at the southern tip of Isle Royale with 15 passengers and a crew of 30. She cruised effortlessly through Washington Harbor to the North Gap Channel between Thompson Island and the main island when, without warning, she struck a rock and began taking on water. Five life boats were quickly deployed in the early morning darkness, saving all passengers and crew. Captain Edward C. Smith and helmsman Fred Nelson boarded the last life boat shortly before the "America" surrendered to the depths of the lake.

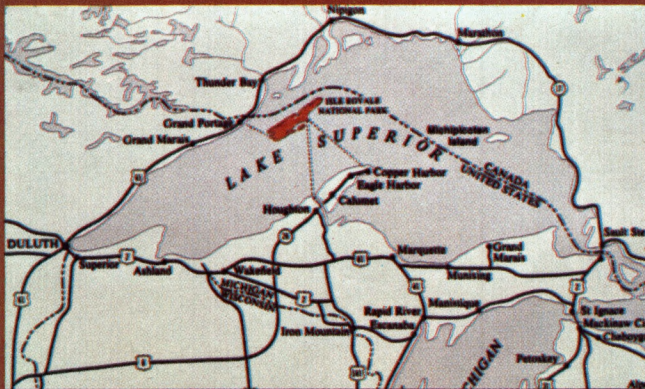
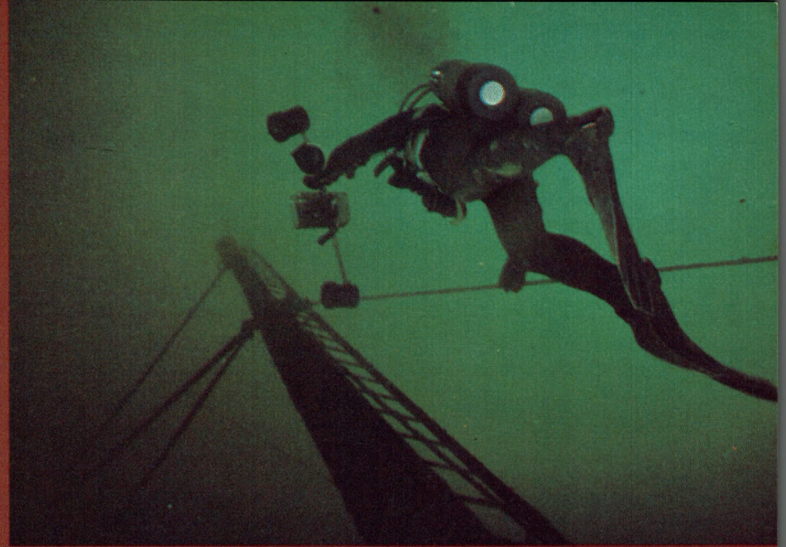
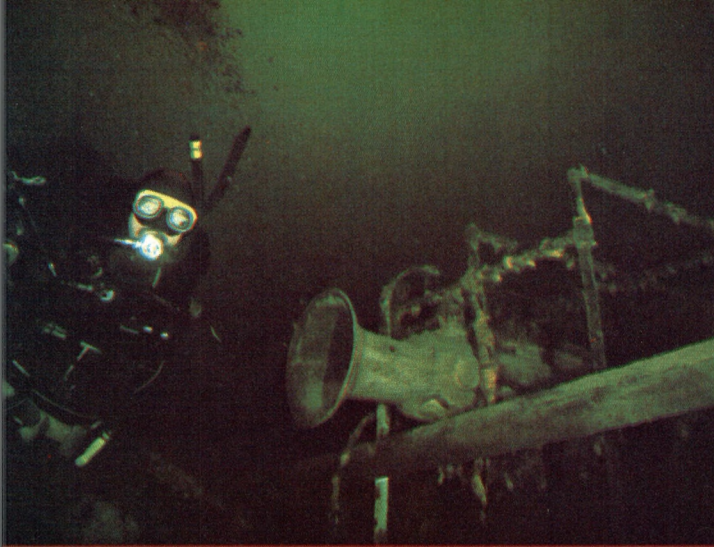
The front half of the superstructure, once a navigational hazard, has long been torn away by ice floes and storms. Behind the exposed bow windlass, the broad sloping deck is dotted with hatches leading into the forward crew's quarters and cargo holds. In the crew's quarters, buried under heavy



Author inside one of the Emperor's huge cooling ventillators (above). In the bulkhead aft of the crew's quarters lies the intact coal and wood burning stove of the galley (above r). Diver examines the loss of a steam pressure guage.



Forward of the crumpled stack is the seal of the Emperor, 130 feet under (above). The diver passes rooms filled with pipes and valves. The frigidity of the water is the main reason why many of the wreck artifacts remain in near mint condition (top left, opposite page). The Emperor's mast disappears towards the surface (at right). The red area of Lake Superior indicates the location of Isle Royale National Park.



silt, are bits of tattered clothing and other reminders of human occupation. A bulkhead and an emergency exit separate the quarters from the cargo holds behind. On deck, aft of the holds, sits the collapsed superstructure, a jumbled pile of timbers almost hiding the boilers below. Slowly, the old steamer begins to assume her former shape.

In a forgotten cargo hold 40 feet below the surface sits a 1928 Model A flatbed truck. The next door leads into the engine room where her powerhouse, a triple expansion steam engine, sits amid a jungle of pipes, gauges, and valves. One flight up and a corridor aft sits a trio of dinner tables, securely bolted to the deck. The meal will never be served, though the old iron stove still stands ready in the galley under 60 feet of water. External examination of the stern reveals empty lifeboat davits, the promenade deck railings and a flag staff. At 70 feet, dug into the rocky bottom at the slope's end, are the ship's propeller and rudder. The damage which sank this once proud ship is the least obvious; a gaping hole, two feet by three feet on her starboard side directly below the coal bunker.

The "America" is seen by many Isle Royale tourists on board the passenger vessels "Voyageur" and "Wenona" out of Grand Portage, Minnesota. They make scheduled stops at the site of the wreck to bid homage to this very fine lady.

Sixty miles away at Isle Royale's northern tip lies the Canadian steamship "Emperor". Unlike the "America", the "Emperor" offers challenges which are beyond the expertise of the novice diver. In 1910 the bulk carrier "Emperor" was built in Collingwood, Ontario by the Collingwood Ship Building Company. Purchased by Inland Lines and registered at Midland, Ontario, the "Emperor" was under the command of Captain Eldon Walkinshaw of Collingwood. 525 feet long, 56 feet in beam, with a depth of 31 feet, she could carry 10,000 tons of iron ore. The 1500 horsepower Scottish-built triple expansion steam engine pushed ship and cargo at a heady 10

knots. Early in 1916, the "Emperor" was sold to the Canadian Steamship Lines of Montreal, and given a new paint job.

On Wednesday June 4, 1947 the Fort William Daily Times Journal proclaimed "Freighter 'Emperor' is wrecked, 12 of her crew drowned, 21 rescued; Ore-laden vessel rams rocks off Isle Royale; Cutter saves survivors." Almost 30 years ago, the steamship "Emperor" with 33 crewmen aboard ran hard aground on the Canoe Rocks at the north end of Isle Royale. With a broken back she waited five painful minutes, then with a sigh of relief slid to the hard granite bottom, drawing with her many of the crew. Three miles away on a routine mission, the Coast Guard cutter "Kimball" heard the dying ship's call for help and rescued the 21 surviving crewmembers. Marking the graves of the three crew-women and nine crewmen who drowned, the bow spar pole stubbornly remained above the surface.


The Canoe Rocks, the "Emperor's" historical marker, are visited often by scuba divers. 30 feet below the surface, the steamship's bow can be seen clearly on a calm sunny day. Her forward cabins and wheelhouse were claimed by the ice floes of winter and carried out to the depths, exposing her large double action steam windlass. The superstructure gone, she still retains her deck winches, machinery, and anchors, encrusted in the hawespipe.

The "Emperor" welcomes visitors to her bow area, but boasts of the dangers involved when diving to the stern deck, which lies 155 feet down under. Running the length of the ship are 30 open hatches, the covers blown off by rapidly escaping air during the sinking. At the fourth hatch, she is bent at a 30° angle downwards, yielding to the curvature of her bed under the tremendous weight of the cargo.

Heading for the stern, you swim to her starboard side, noticing the bold white letters "Canada Steamship Lines." Still overtaken by her beauty, you continue downward until at 130 feet, you are struck by her seal "Emperor", posted in front of the half-collapsed stern cabin. Written in bold black letters, this sight sparks an instant surge of adrenaline; you have now met the "Emperor" face to face.

On her port side, in the crew's quarters are the telltale signs of rapid departure; blankets, clothes, and bedding strewn amidst the silt-filled bunks. Aft of the crew's quarters lies the ship's galley, complete with a beautifully preserved coal and wood burning stove. Directly above rests the crumpled stack with its silent foghorn, highlighted by her glittering crown, a 60 foot mast reaching for the surface 130 feet above. The entire stern of the "Emperor" looks as though it could whisk crew and cargo to the next port of call, which was to have been Ashtabula, Ohio.

continued page 108



THE DEEP

One word above all others characterizes the production of Peter Benchley's "The Deep". That word is "reality". The filming of an adventure based on Benchley's best seller became an adventure in itself, involving unique and innovative production techniques developed to capture the suspense, the beauty, and the terror above and below the surface of the ocean. 40 per cent of the sequences were shot underwater, another ten per cent on the surface, and the other 50 per cent on land.

The stars of the film — Robert Shaw, Jacqueline Bisset, Nick Nolte, and Lou Gossett — learned to dive, and then had to learn how to act underwater. Director Peter Yates, producer Peter Guber, and the director of photography, Christopher Challis, also learned to dive, joining the most experienced and versatile underwater team of cinematographic experts ever assembled. The underwater team, headed by Al Giddings and Stan Waterman, represented 80 per cent of the best underwater talent in the world. "The Deep" was filmed in four oceans, at depths to 90 feet, on locations in the British Virgin Islands, Bermuda, and off the Great Barrier Reef of Australia. The film's stars, production team, and supporting players made a total of 8,895 dives, 10,780 man-hours beneath the surface, and consumed 1,054,000 cubic feet of compressed air.

After 153 days of production, the post-production activity is in full swing to bring the film to theaters throughout the U.S. and Canada on June 17. International openings will follow later in the summer and fall.

Filming of "The Deep" began on July 5, 1976, between Salt Island and Peter Island in the British Virgin Islands. The set was an actual shipwreck — one of the most famous, and mecca for scuba divers — the Royal Mail Ship "Rhone", which sank in a hurricane in 1867; 125 of her crew of 135 were lost. Split into sections and angled from 30 feet down to 90 feet, it's a perfect example of a coral-encrusted wreck. The waters off the British Virgin Islands are noted for their colors and clarity, another prime consideration in selecting the site. The film company obtained the cooperation of the BVI government in halting all sport diving on the Rhone during production. This year, with the release of the film, the Rhone will become an even greater

favorite for scuba divers the world over and the islands anticipate an upsurge of tourism.

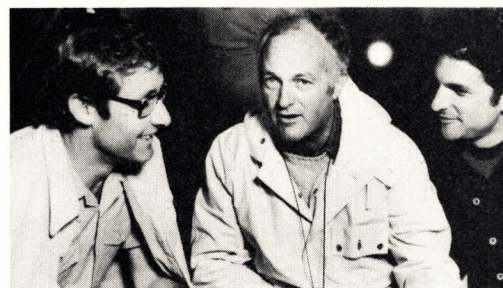
Shaw, Bisset, Nolte and Lou Gossett began their skin-diving lessons at home before flying to BVI. Upon arrival, their instruction began again under the supervision of Al Giddings. Within days, each was diving in the ocean, an experience that was totally new to them. Before long, however, the techniques of diving and then the techniques of acting with mask and regulator became second nature.

The company filmed in BVI throughout July, and every frame was taken underwater. In BVI Al Giddings tested the special camera equipment he had designed for "The Deep." The action required movement and flexibility equal to that of surface cameras — reflex viewing, interchangeable lenses, and total mobility. Never before had 35mm cameras with Panavision lenses been used underwater. Giddings advanced the state of the art of underwater cinematography, designing and building camera housing that enabled he and Waterman, and their team, to put the reality of the deep on film. Previous 35mm underwater cameras weighed 225 pounds; Giddings' cameras weighed 75 pounds; in the water they weighed a scant 8 ounces. Concurrent with the development of the cameras, the team developed lighting techniques that would cover long shots, medium shots, and closeups.

Never before had the director, cinematographers, lighting men, sound men, and prop men functioned underwater for so many hours. Never before had a dramatic story been photographed so extensively in the water. That required another "first" for "The Deep." Geri Murphy became the first underwater script continuity girl, complete with underwater writing tablet fastened to her wet suit.

In BVI, Bermuda, and Australia, the depth of the dives limited the number of hours of actual filming. In BVI, for example, there were an average of three dives per day, which took the entire day. Before each dive, Yates and his team reviewed the action on the blackboard, carefully outlining the scene and its movements. After each dive and its filming, the team often had to decompress to avoid the "bends." On the dive boat, a doctor and decompression chamber were always at the ready.

Fortunately, the chamber never had to be used, but there were close calls. Once, Nolte was 90 feet deep, far into the wreck, wearing a Descmask attached to 200 feet of air hose that led back through the ship up to the boat's compressor. Suddenly, the word was relayed that the compressor had stopped. Everyone was ordered to the surface. The underwater experts, stationed at key points throughout the wreck for just such an

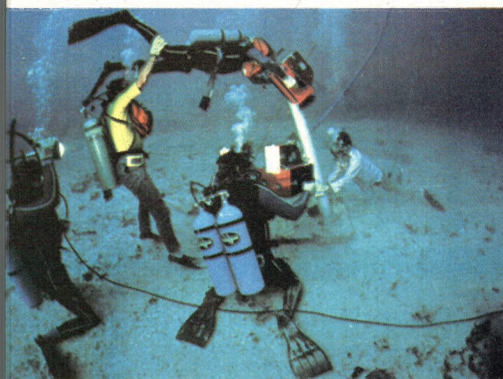


Author Peter Benchley, Peter Yates, and Peter Guber confer on the set.



During production of "The Deep" the underwater film crew, headed by Al Giddings and Stan Waterman, used many innovative techniques developed especially for this film.





In scenes from the movie, Robert Shaw, Jacqueline Bisset, and Nick Nolte examine treasure from two mysterious wrecks found one atop the other in the waters off Bermuda.



emergency, quickly moved to Nick's assistance but, as one of them said later, he was already heading up on his own. Another time, in a scene in which Nick had to grab Jackie's ankle to keep her from swimming to the top too quickly, she accidentally kicked the regulator out of his mouth. Once again, a member of the team reached them immediately and gave Nick air from his own tank. On yet another occasion, Lou Gossett, diving to maximum depth, did not hear or see the signal for "cut." He continued to swim until he was grabbed from behind by a member of the crew who spotted him in the distance moving away. Knowing the experts were always in the water filming and watching gave the entire company a sense of security that overcame their initial fears and hesitations, enabling them to concentrate on the dramatic requirements of the film.

In Bermuda, the company filmed on land, on the water, beneath the ocean surface, and in the world's largest underwater set. Constructed on the site of what was once a yellow fever hospital, the set contained over 1,000,000 gallons of sea water. Each day, over 200,000 fresh gallons were pumped in and then pumped back out to the sea. The set was stocked with over 300 fish, from groupers and grunts to a shark and a moray eel. In the underwater set, which measured 120 feet across and 33 feet in depth, the film company could shoot almost continuously. The set, designed by Tony Masters, contained the intricate chambers and holds of the two wrecks that in the story are discovered one on top of the other. The set also matched the interior of the Rhone with some added sections to heighten the action dramatically and cinematically.

Throughout the underwater filming the team used a unique talk-back system. Yates' face mask contained a microphone that allowed him to communicate with the surface team. There, his directions were heard over a speaker system by all, both above and below the water.

While the stars and underwater team were filming in the underwater set, a second unit was filming exteriors, backgrounds, and key action sequences with the supporting players throughout the island. On some days, the two units worked together. On two occasions, Nick Nolte filmed part of the day underwater in scuba gear, then surfaced, dried, jumped into a car, and was sped away to a tense scene along the beach. When that scene was completed, Nolte raced back to the underwater filming and was once more in the water.

Bermuda was another prime example of the reality of "The Deep" because it is the actual setting for Benchley's story. 600 miles from the coast of North Carolina, it's a string of tiny islands 21 miles long. The wrecks of more than 300 ships still ring its reefs. With the

full cooperation of the Bermuda government, "The Deep" became the first major film to be shot there virtually in its entirety. More than 200 Bermudans joined with the American and British members of the production team, and another 300 appeared as players or extras in scenes on the island.

In addition to the world's largest underwater set, the company built a replica of St. David's lighthouse, which was blown up for a major sequence, and a spectacular elevator shaft running from the beach more than 100 feet up a cliff with a series of complex interiors. The principal "studio" was in the 200 year-old dockyards. The huge, warehouse-like buildings with stone walls two and three feet thick made ideal sound stages.

The company shot at the most scenic locations in Bermuda: the historic town of St. George, founded by English settlers in 1612; the capitol city of Hamilton, Coney Island, and miles of winding roads and pink sandy beaches. They also took advantage of local events such as the annual colorful Cricket Cup Match, at which hidden cameras photographed Robert Shaw and Lou Gossett as they blended in with the real crowd.

The reality of "The Deep" led to the filming of one sequence that required the underwater team to travel halfway round the world to the Great Barrier Reef off Australia. There, they filmed a group of gray sharks in a feeding frenzy, a scene that could not be duplicated anywhere in the world. After 720 dives, spending 1,080 hours underwater, and exhausting 314,000 cubic feet of compressed air, they got the scene they came to shoot. Expected to last a mere two minutes on the screen, it is one of the peak moments of excitement, sure to set you on the edge of your seat — the back edge!

Be on the look-out for the nationwide premier of "The Deep", June 17, 1977.



THE SHARK — TODAY'S

by Patricia Bird

A sea is a universe unto itself, rich in its diversity of plant and animal life. The coastal waters surrounding the Southeastern U.S. are unique in their geological and hydrographical conditions. Patch reef complexes and the warming influence of the Gulf Stream offer innumerable habitats for both temperate and tropical fish species, and present an especially varied panorama of marine fauna to the observant diver. Such diversity extends to the kinds of sharks present. Of the 250 known species of sharks, 25 may be found in Southeastern waters.

These range in size from the dogfish, about three feet in length, to the whale shark, which has been recorded at 45 feet.

In today's civilized world there are few predators left that dare to stalk man, except other men, of course. Perhaps this accounts for the fascination with which man views the shark. They are interesting animals in their own right, however. Sharks belong to the class Chondrichthyes, meaning fish with skeletons of cartilage, which also includes the rays, skates, and chimagrass. Sharks differ from bony fish

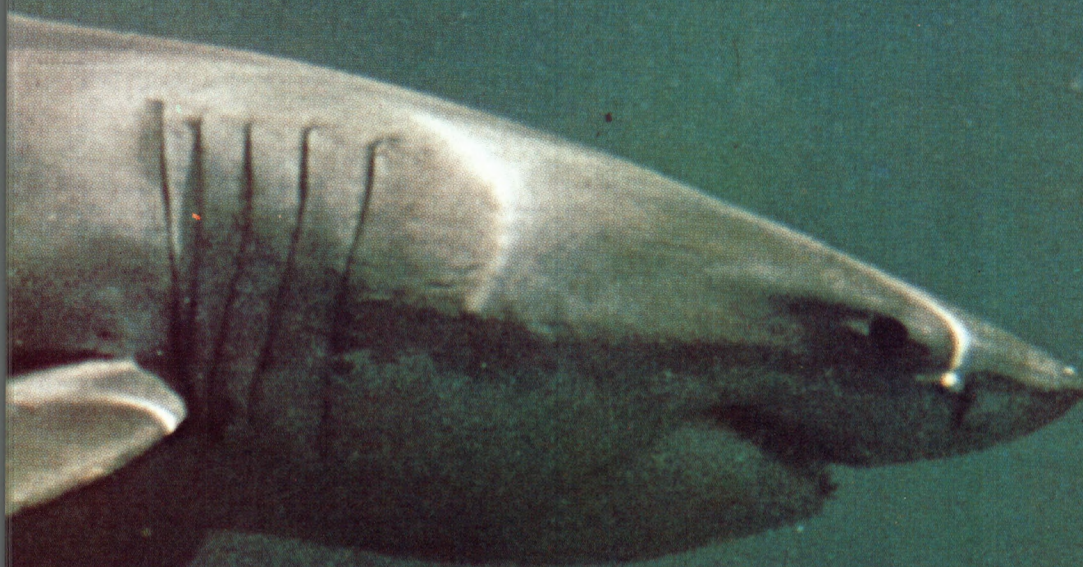
photograph by Carl Roessler

FASCINATING ENIGMA

(Osteichthyes) in a number of ways, including the presence of five to seven external gill clefts rather than just one gill opening enclosed by a bony plate, the absence of a swim bladder, and in having primitive placoid scales (dermal denticles) that are of identical composition to the teeth. These scales could cause injury if one is as little as brushed by the body of a moving fish. The jaw teeth of sharks are modifications of the denticles and are continually being renewed as the slow forward movement of the membraneous tissue in which they are set advances

reserve teeth to replace those pushed off.

Sharks are primitive animals that first appear in fossil records 300 million years ago, during the Middle Devonian Period. They are superbly equipped predators that have needed no extensive evolution for their success as a species. Even though sharks of the modern type can be traced back directly 150 million years to the Jurassic Period, they exhibit some anatomical specializations that rival those of mammals. All shark species have internal fertilization, the male using intromittant organs called claspers. A



small number of shark species lay eggs that hatch unattended in the sea (oviparous reproduction), but the majority give birth to living young. Of these, the young of ovoviparous sharks hatch from eggs within the uterus of the mother and undergo further development prior to birth, while the viviparous species form a yolk sac placenta, a connection between mother and embryo analogous to that in humans.

Sharks and their fellow elasmobranchs, the skates and rays, are used extensively in biomedical research because their simple physiology relates directly to that of mammals. Sharks appear to be infection and cancer resistant; shark serum has been used effectively against certain viruses and to partially suppress tumor development in experimental animals. The shark's blood-brain barrier is more effective in screening toxins from the cerebro-spinal fluid than that of humans. Theoretically, sharks should never die, as their tissue regenerative powers are remarkable and appear to continue in part for the lifetime of the animal.

Sharks share with man the usual senses of hearing, smell, vision, touch, taste, and the common chemical sense, some of these systems being extremely sophisticated in the shark. The four major sensory systems used in the detection of prey are the auditory, olfactory, visual, and lateralis. Sharks have inner ears, which are open to the sea through pore-like canals. They readily pick up low frequency irregularly pulsed sounds, such as those made by a struggling fish or an erratically moving swimmer or diver. These sounds have biological significance for the shark and may be detected from up to a mile away. Their olfactory sense is very keen; scents can be detected up to a quarter mile away, depending on the type of scent, water dispersment, and current dilution. Sharks can follow an "olfactory corridor" to the source with lateral head movements helping the animal home-in. Shark vision was thought to be poor, but research has shown otherwise. They see well in both bright and dim light, and readily discriminate between light-dark shades and motion contrasts. There is even evidence that some species may possess color vision. Underwater, the eye of a shark functions to about the same distance as that of man. If you can see a shark circling at the periphery of your vision it can see you too. A lateral line is characteristic of fishes in general, but the lateralis system of sharks is unique, and combines two discrete functions. Sensory pores on the sides of the animal's body are sensitive to near field water movements; those in the head, the ampullae of Lorenzini, have the function of electro-reception. The ampullae are used in

the detection of prey at very close range, as for instance when vision is obscured by murky water or when the shark's head is raised at the moment of bite.

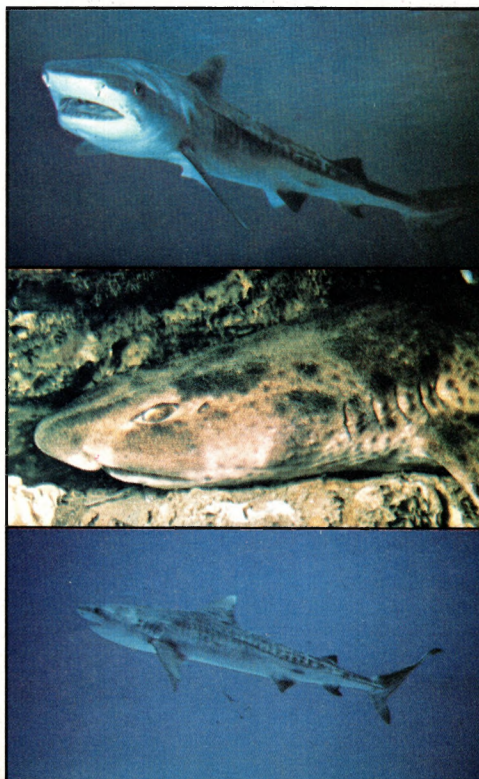
Sharks have learning ability and exhibit social behavior, surprising features in these primitive vertebrates. Interactions between sharks are known to include give-way maneuvers that indicate existence of a rank or peck order among species. Behavioral posturing has been described, such as the antagonistic display of the gray reef shark of the Pacific in response to apparent territorial impingement by divers. In a display the head of the shark tends to be raised, the back hunched, the body held stiffly and the pectoral fins pointed sharply down. The animal appears to be swimming with its whole body, rather than in the slower, easy pattern using primarily the tail that is normally used for propulsion. The posture of display is distinctive, and should be quite evident to anyone who has ever observed the usual swimming mode of a shark; its presence should immediately signal caution to the diver.

Contrary to folklore, most sharks have specific food preferences and are not scavengers. Fish and invertebrates are the usual foods and many species show adaptive features that reflect their lifestyle. The prong-like teeth of the sand-tiger help it hold the free swimming fish on which it feeds; the long tail of the thresher is used to herd schooling fish; and the sensory barbels of the nurse shark, which contain taste buds, help it find food as it moves along the bottom. Certain sharks have behavioral traits and feeding patterns which pose a greater threat to the diver than others. In Florida there are five species, all of which have been known to enter shallow water, that consistently seek large prey: the tiger, great white, bull, dusky, and great hammerhead sharks. The bull is the only shark known that appears to have a preference for other sharks as food.

Table 1 lists the larger shark species that may be found in the Atlantic and Gulf waters off Florida. The type of sharks that divers in Florida might encounter varies somewhat with the time of year and the location. Sharks can be categorized as "residential species" which are found in the same general area throughout the year, or as "migratory". Sandbar and dusky sharks for instance are distinctly migratory, and are only in Florida waters during late fall through early spring when water temperatures are lower. Sharks may also be separated into principal and accessory populations. Animals of the accessory population are out of phase with the main breeding population of their species in respect to geographical range, seasonal migrations, feeding

It would be interesting to note the kind of shark that one observes underwater. Unfortunately, free swimming sharks tend to look alike in stress situations, particularly those in the closely related genus Carcharhinus. The key may be useful for general field identifications; only characteristics that can be noted underwater are included. Notice that there are similarities that characterize whole groups of sharks, like the shape of the head or tail and the relative size of the dorsal fins. When meeting a shark, of course one does not generally wait around trying to key it out, but familiarity with the general body configurations and study of the features in which individual species differ should enable you to make an educated guess about the kind of shark seen. The distinctive whale shark and the small shark species such as dogfish or finetooth are not covered in the key.

To use the Key start at the top and check the characteristics listed beside the Roman numeral. If the fish has that characteristic, check the indentation underneath. If that characteristic is not evident go to the next Roman numeral, and so on down the Key until you find a heading and indented characteristic which both describe the animal in question. For instance if the shark's head is not expanded (II) its tail is much shorter than body (III) upper tail lobe is much longer than lower (IV) both dorsals about the same size and first dorsal is over the pelvic fins with barbels before the mouth, you have a nurse shark.

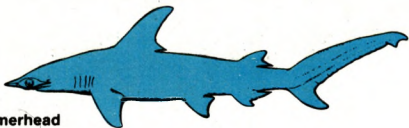

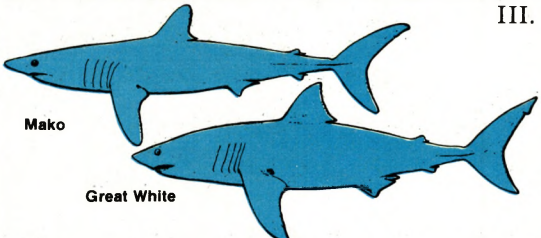
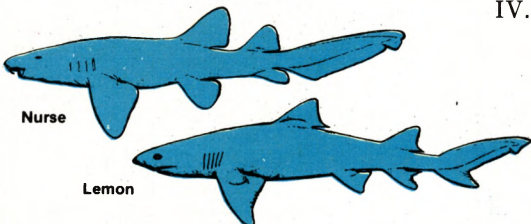

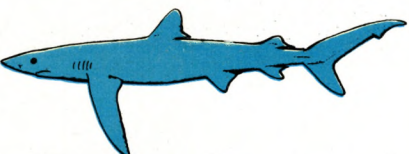
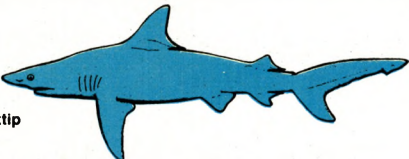
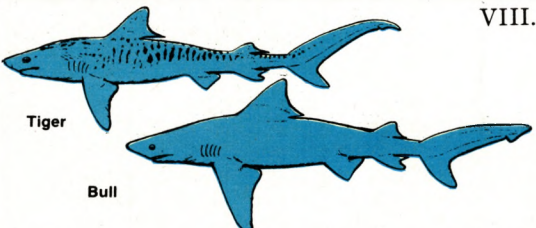
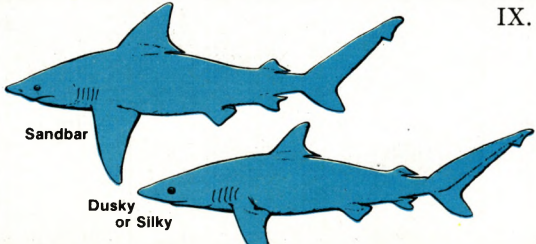


Rick Frehsee

George Perina

Bob Wallace

KEY FOR IDENTIFYING FREE-SWIMMING SHARK SPECIES

 <p>Hammerhead</p>	<p>I. HEAD EXPANDED FROM SIDE TO SIDE:</p> <p>Head hammer-shaped HAMMERHEAD</p>
 <p>Thresher</p>	<p>II. HEAD NOT EXPANDED:</p> <p>Tail as long or longer than body THRESHER</p>
 <p>Mako</p> <p>Great White</p>	<p>III. TAIL MUCH SHORTER THAN BODY:</p> <p>Tail lunate (both lobes about equal length, as in a mackerel); body before tail flattened, with a keel:</p> <p>Teeth prong-like; color of back: blue MAKO</p> <p>Teeth triangular; black spot at pectoral base GREAT WHITE</p>
 <p>Nurse</p> <p>Lemon</p>	<p>IV. UPPER TAIL LOBE MUCH LONGER THAN LOWER:</p> <p>Both dorsal fins about the same size:</p> <p>First dorsal over pelvic fins; barbels before mouth .. NURSE</p> <p>Snout blunter; no spots LEMON</p>
 <p>Whitetip</p>	<p>V. FIRST DORSAL FIN HIGHER THAN SECOND:</p> <p>First dorsal rounded; tipped with white WHITETIP</p>
 <p>Blue</p>	<p>VI. FIRST DORSAL TRIANGULAR:</p> <p>Body very slender; pectoral fins long, slender, sickle-shaped; color of back: blue BLUE</p>
 <p>Blacktip</p>	<p>VII. BODY MORE ROBUST; PECTORALS SHORTER USUAL SHAPE:</p> <p>Fins conspicuously tipped with black BLACKTIP</p>
 <p>Tiger</p> <p>Bull</p>	<p>VIII. FINS NOT CONSPICUOUSLY BLACK TIPPED:</p> <p>Snout short and blunt; adults heavy bodied:</p> <p>Large round eyes; may have spots or bars on body .. TIGER</p> <p>Small eyes; no spots or bars BULL</p>
 <p>Sandbar</p> <p>Dusky or Silky</p>	<p>IX. SNOUT LONGER:</p> <p>Head much more tapered:</p> <p>First dorsal fin high; body reddish-brown; never more than 8 feet in length SANDBAR</p> <p>First dorsal lower; body grayish-brown length to 12 feet DUSKY</p>

habits, and the reproductive cycle. The term "rogue" has been applied to such sharks, and they may be more guilty of attacks on humans. They tend to be found more often in shallow water than others of their species, and show a higher incidence of a major injury or deformity that could interfere with normal feeding.

The possibility of shark attack has probably occurred to every salt water diver. Fortunately, the odds of being involved in one of the 50 to 100 attacks reported annually on a worldwide basis are very low. All sharks should be treated with respect, however; the diver, after all, is the trespasser in the underwater domain, not the fish. As shown in the statistical analysis of the International Shark Attack File (ISAF), the medium size of attacker sharks, 6 ft. 10 inches, is not large. These medium sized sharks can inflict severe or even fatal injury on a victim. Many diver cases involve overtly provoked attacks; it should be clear that no shark should be provoked, no matter what kind or how small it is. Nurse sharks, for instance, are frequently molested by divers, and have been featured on advertising posters that invite one to "come ride a shark". The nurse is a sluggish animal that likes to lie quietly under ledges minding its own business. If aroused, it is quite capable of using its many small sharp teeth. The nurse has 9 functional rows in the upper jaw, 8 to 12 in the lower. It also has a tendency to hold its victims

tenaciously. The ISAF contains reports of completely unprovoked attacks by this "harmless" species. Attack may be unconsciously provoked by divers who interfere with the courtship or feeding patterns of sharks or who persist in territorial intrusion. Fishing activity of all kinds has a strong relationship to shark incidents. Spearfishermen in particular should exercise caution, as the fish blood and juices released into the water and the vibrations generated by wounded fish constitute powerful natural stimuli for the attraction of sharks.

Sharks have been described as unpredictable, but there is much about their biology and lifestyle that remains unknown. The behavior of most animals can be foretold with some certainty if the biological data concerning them are understood, and so it may be with the shark. Continuing research, both in the laboratory and in the open ocean is contributing new knowledge about the natural history, physiology, sensory systems and behavior of sharks. Such knowledge can help the diver avoid generating conditions that duplicate biological stimuli that excite sharks. Research proceeds slowly, however; field work with large, free swimming predators is difficult and dangerous, and laboratory results can not always be related to natural behavior. Thus it appears that for some time to come, the shark will remain a fascinating enigma of the sea.

Table 1. Some larger shark species which may be found in Florida waters.

MORE COMMON SPECIES INSHORE

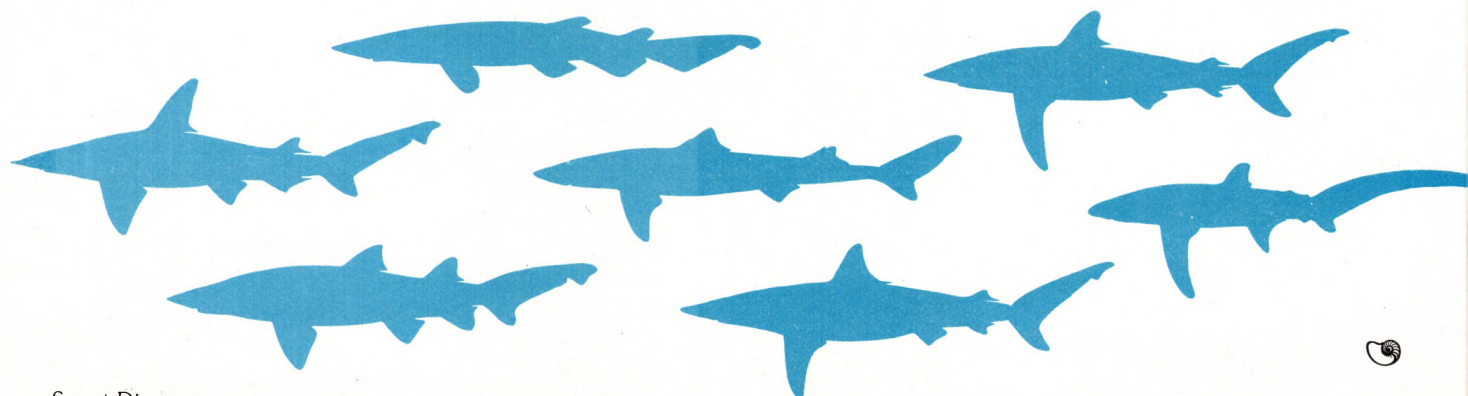
COMMON NAME	SCI. NAME	MAX. SIZE	USUAL DIET
Nurse	<i>Ginglymostoma cirratum</i>	14 ft	invertebrates, small fish
Sand tiger(1)	<i>Odontaspis taurus</i>	10 ft	fish
Bull (2)	<i>Carcharhinus leucas</i>	12 ft	fish, other sharks
Black tip	<i>Carcharhinus limbatus</i>	8 ft	fish, squid
Spinner	<i>Carcharhinus maculipinnis</i>	8 ft	fish, squid
Sandbar	<i>Carcharhinus milberti</i>	8 ft	fish
Dusky	<i>Carcharhinus obscurus</i>	12 ft	fish, lg. prey
Tiger	<i>Galeocerdo cuvieri</i>	30 ft	omniverous, lg. prey
Lemon	<i>Negaprion brevirostris</i>	11 ft	skates, rays, sm. fish
Hammerhead	<i>Sphyrna lewini</i>	13 ft	bottom fish, skates, rays
Great Hammerhead	<i>Sphyrna mokarran</i>	15 ft	fish, lg. prey
Smooth Hammerhead	<i>Sphyrna zygaena</i>	14 ft	invertebrates, rays, sm. sharks
Bonnethead	<i>Sphyrna tiburo</i>	6 ft	invertebrates, sm. fish

RARER SPECIES

Whale shark	<i>Rhincodon typus</i>	45 ft	plankton, sm. fish
Thresher	<i>Alopias vulpinus</i>	20 ft	schooling fish, squid
Great White	<i>Carcharodon carcharias</i>	36 ft	large prey
Mako	<i>Isurus oxyrinchus</i>	12 ft	fish (including swordfish)
Silky	<i>Carcharhinus falciformis</i>	10 ft	fish
Whitetip	<i>Carcharhinus longimanus</i>	13 ft	fish, squid
Blue	<i>Prionace glauca</i>	12 ft	fish, squid

(1) More common on Atlantic than Gulf coast.

(2) Enters estuaries.

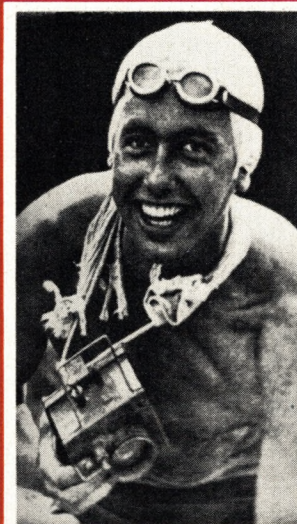


HANS HASS TODAY

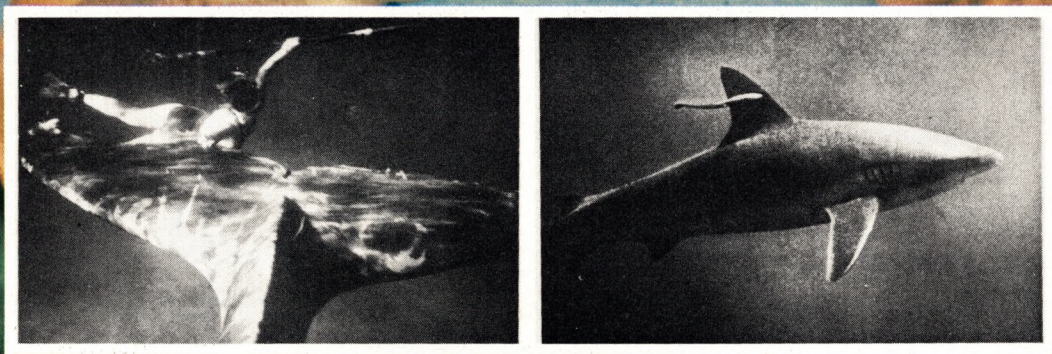
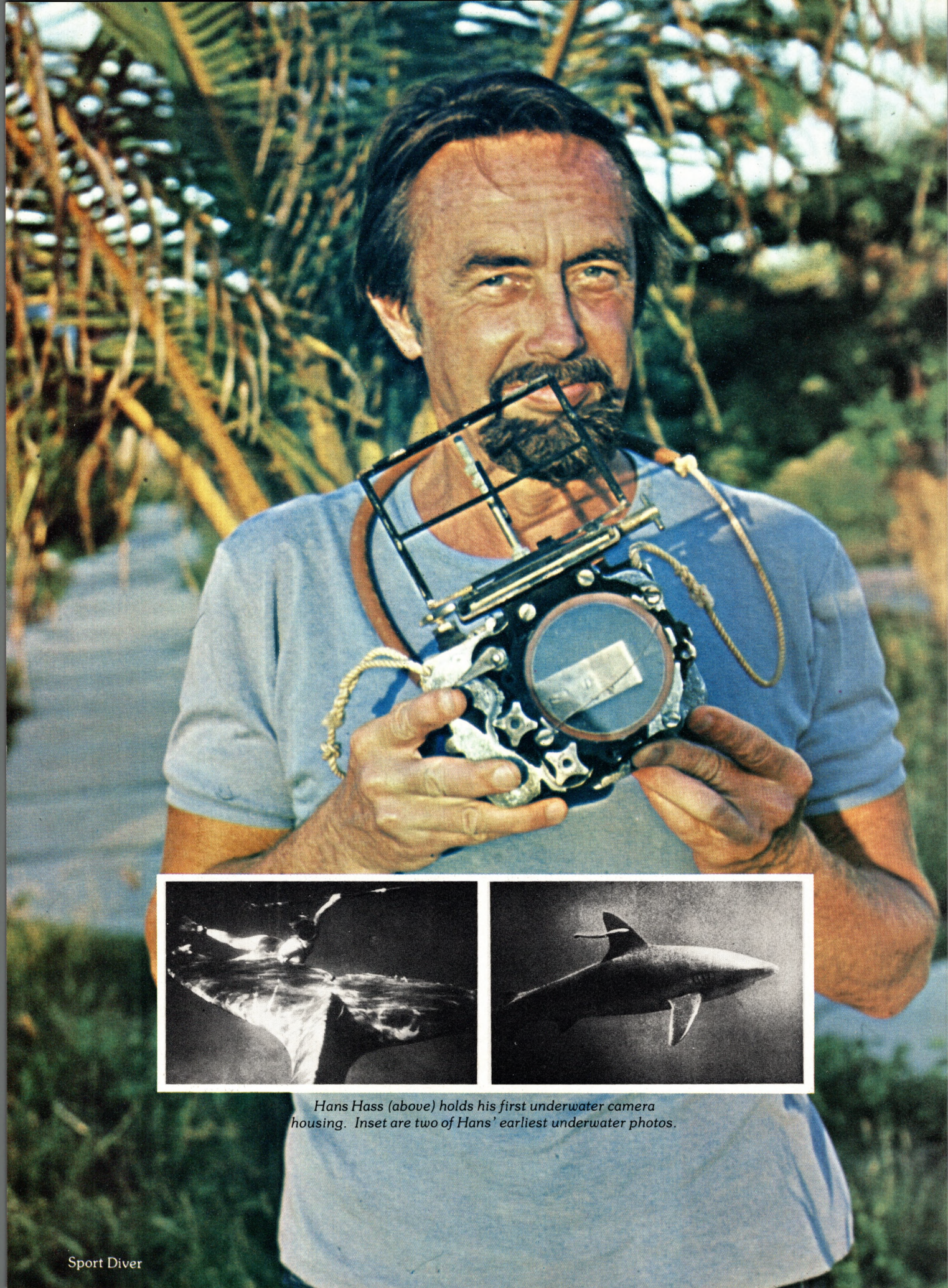
It isn't often one gets to meet a childhood hero. I was 13, reading the books of Austrian diver Hans Hass and just beginning to develop a strong interest in diving. Inspired by his spearfishing exploits, his encounters with sharks and manta rays, I took up diving in earnest, and at the age of 15 was using scuba regularly with a dive club in Richmond, Virginia.

That was 18 years ago, and since then diving has flourished. Yet the name of Hans Hass, a man who inspired divers not only in this country but all over the world, is little known to American divers under 30. Everyone has heard of Cousteau, but not Hans Hass.

Hans Hass around the time of the publication of his first book, "Diving to Adventure".



by Tim O'Keefe



Hans Hass (above) holds his first underwater camera housing. Inset are two of Hans' earliest underwater photos.

"it is an absurdity to foster animals lovingly and make a study of them when this very activity contributes to their extermination."

Hass was the first European, and one of the first anywhere, to take underwater photographs. He was the first to explore many waters considered too dangerous for divers because of marine life. Haas was the first to photograph sharks underwater, along with manta rays. His adventures with these creatures are legendary. He is a noted cinematographer; his film "Beneath the Red Sea" won several international awards in 1951. He has published a dozen books, most translated into all the major languages, and the list of his accomplishments goes on.

Why isn't Hass as well known today as he should be? Ironically, just as diving was becoming a popular sport, his interest in it declined. He had already done nearly everything he wanted, and his attention shifted to other fields. He became one of the most celebrated drop-outs in diving history.

In recent years he has begun diving again and resumed publishing works related to the sport. Most of his diving today is for pleasure, done more informally than his earlier elaborate expeditions.

In November of 1976 Hass and his wife, Lotte, also a proficient diver, returned to the Caribbean islands of Bonaire and Curacao where almost 40 years earlier Hass had dived and photographed sharks for the first time. His exploits were recorded in a book still read today by many, a work I have read no less than five times, "Diving to Adventure".

Through the courtesy of Bill Kielman of

MANIFESTO II

For some time the naval forces of various great powers have been training marine mammals (dolphins, sea-lions, blackfish whales, and others) to assume duties which are partly harmless (retrieving lost torpedoes, performing messenger services, and the like) but partly also of a warlike nature (attaching limpet mines to enemy ships, repelling or killing enemy frogmen, espionage). It was reported in the press only recently that one great power used a trained dolphin to smuggle special instruments into the naval base of another power and retrieve them again a week later, thereby gaining vital information.

It is clear where this development must inevitably lead. In the event of war or increasing political tension the marine mammals in question will be attacked and exterminated. As they wear no distinguishing uniform, it is impossible to know whether one which turns up near a ship or a base is harmless or trained. Every marine mammal has to surface regularly to draw breath, so it is easy to shoot it.

A deep-rooted notion still prevails that the world and its inhabitants were made for man, that we have the right to treat the rest of nature entirely as we please. Research has established beyond reasonable doubt that this is not so. The planet Earth and the creatures living on it were not made for man. We are but a component part in a process of development which began with the first organic structures some 3,000 million years ago. In the framework of the evolution we have evolved from the animal kingdom and have become vastly superior to other living beings by reason of our intelligence. Just as it was always the stronger and fitter who prevailed, throughout this development, so now we are using our power to subordinate the rest of nature to our interests and make it subservient to us. Harmful effects of our behaviour have already shown, however, that it is not clever of us to follow this course ruthlessly. Efforts are today being made through environmental conservation to counteract this self-inflicted damage.

In the light of this, the great powers should also renounce any further training of marine mammals in the framework of combat units. The same services can today be provided by technical devices. Doubtless such a renunciation must hit many scientists who are able within the framework of the military programme to conduct far-reaching experiments on these animals for which such abundant funds would otherwise not be provided. But this disadvantage must just be accepted, for it is an absurdity to foster animals lovingly and make a study of them when this very activity contributes to their extermination.

April 13th, 1973

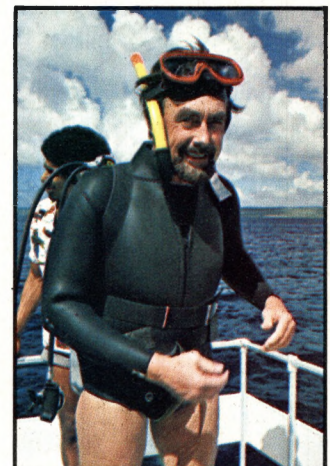
Dr. Hans Hass

International Travel in New York City, ALM Dutch Airlines, the Curacao Hilton, and Captain Don Stewart's Habitat on Bonaire, I was fortunate enough to spend a week with Hans and Lotte Hass.

This was not entirely a pleasure trip for them. Although it was in part a sentimental journey for Hass to revisit the scenes of his early adventures, he was also working on two specials for German

television about the changes at Bonaire and Curacao since his first visit. Hass usually produces one or two such TV documentaries each year. In addition, Hass was preparing a new introduction to "Diving to Adventure" based on his latest trip. The book will be republished in German again this year. The following interview took place over several days in Curacao and Bonaire.

We first met on the terrace of the Curacao Hilton. Hass had told me over the phone that I would recognize him by his goatee, as if he were an unknown. Hass can pass for a man at least 10 years younger; he is approaching his 60's. I was impressed with his great enthusiasm for just about everything. One thing about Hass surprised me. I'm six feet tall, and he is shorter than I. Heroes always seem at



least ten feet tall. Since Hass is best known for his work with sharks, this is where we started.

SPDM: After diving with sharks for almost 40 years, what do you think is their actual danger to man?

Hass: Well, I think the danger is minute. Years of diving uphold my view, which I stated in my first books after having had experiences here for eight months in Bonaire. We met quite a few sharks and found out how cowardly they are. This is common knowledge today to almost every diver in tropical waters. I mean, the problem is not how to avoid sharks or how to ward one off, but how to find one or how to approach one to photograph. Have you ever tried?

SPDM: Yes, but I have never produced a good shark picture.

Hass: Well, that is a real problem. With the great hysteria after the film "Jaws" I am publishing a new book which will be put out in the spring entitled "Sharks - How They Really Are". It's really my last try in this respect, because I have published more than ten books about underwater research and sharks. Sharks were my primary objective for 15 years because my idea in those days was bringing groups of scientists to work on the sea bed, and the important question was; can we do that without endangering the people? Therefore for almost 15 years I travelled to places where they told me, "Here you can't dive, it's impossible, you'll be killed instantly." In the Red Sea, the Indian Ocean, in Australia, and so forth. So, wherever they told me was a dangerous spot, I said "Beautiful, in we go," and it was always the same, nothing happened."

That doesn't mean that no attacks at all occurred, only that they occurred very, very rarely. In this book of ours we have found as a comparison that every year in the United States more people die from bees than from sharks. My interest is to bring this information in relation to the actual danger. For me the problem is not a problem of sharks, but a problem of human psychology, the question is why do people love so much the ferocious stories about sharks. That is why we are presented with these stories.

"Jaws" would never have been the success it was if there had not been a hidden wish in people to have this fear attached to sharks. There are some symbols that create fear. I mean you have symbols like King Kong, and people don't want to dispose of these stories whether they are true or not.

If you present an underwater film, and in this film you do not have a shark with some weird music, people

will be disappointed. They feel it is part of the bargain. Therefore, they want it and they get it, and what they get is great exaggeration. In all these years where I challenged the danger of sharks, I mean sharks that really meant business, I was only really attacked four or five times. By white sharks, tiger sharks, where they came not fast, but with the obvious wish to bite me. And with my little stick I clipped them on the head, and they went away and came back again and went away again.

There were many more attacks that we today think are part of the territorial behavior of sharks. These are not true attacks, but they come quick, and they just turn around and nothing happens. They want to scare you out of their territory. This happens once in a while to divers. Also, if you harpoon fish they make this movement. This is a strong attraction to the predator who wants the fish, and if you have the fish in your hand, well, you may be bitten.

So I can only repeat what I have said in my first book, that the shark is a very beautiful animal, and for the diver it is a fantastic moment to meet such a majestic creature. Sharks are shy, surprisingly shy. The point is they could attack and the question then is, why don't they do it? Don't they like us? The answer is that they are attuned to certain patterns which mean for them prey, and the human being doesn't fit into this pattern, except perhaps with the white shark and deep-sea sharks that are so big they consider any object in the sea as potential food. But the sharks around the shore are not usually attuned to attack man. There is one exception, however. I think coasts where seals and sea lions live are more dangerous because there the sharks are used to feeding on the seals and their babies, and the seal looks very similar to man. So I think the reason you find comparatively many attacks on the west coast of North America, California up to San Francisco, or New Zealand, or Australian coasts, or the Galapagos Islands where we found the sharks quite inquisitive, it may be that the sharks are actually after the seals since they have learned that the seal is good prey.

SPDM: In regard to the psychological factor about man wanting to be afraid, there really isn't much left for man to be afraid of, is there?

Hass: That is true. The human

being we know today has many drives. We have sexual drives, play drives, but there is also a true innate fear drive. That is why children will go into the dark to be scared, to get rid of this very natural impulse. The human being wants to be a little afraid. That is why you like to see thrillers, and that is why many of these things attract the human being. For the insecurity it creates, to get rid of this drive, to be afraid, which is an inborn drive that wants to somehow be stimulated.

SPDM: In the past year I have heard many theories about what a shark does and the movements he makes before he attacks. Some say a shark does a kind of a dance, others say he stops and almost smells, like a dog, then he bites. What have you found to be the usual pattern, or is there a normal movement pattern?

Hass: If you take the reports of shipwrecked pilots you are surprised to find there are reports of men who floated through the sea 10 or 12 hours continuously surrounded by sharks and it took five, six, or even seven hours before the shark finally tried to take its first bite. I think the normal approach to a human being is a quite careful one, unless the shark thinks you are a seal, because he knows how to deal with seals.

It is quite interesting that in one instance where two shark attacks occurred, probably by a white shark, the victim didn't see the shark. That means the shark approached very carefully. The one time I was attacked by a white shark, I saw him in the last moment. I was filming another shark, and suddenly I saw this very big shark coming very slowly towards me, sneaking up. So I don't believe in sudden attacks unless you are in a territory where there are seals or sea lions.

In the tropical seas I would say that the normal pattern is if you throw your anchor, if you make much noise, there may come the odd shark who will have a quick look and off he goes again. You must be very quick if you want to film. And toward the morning or the evening sharks come into shallow water and they will circle; but I cannot really say about true attacks, because I would say I met thousands of large sharks over the many years because I searched for them. The normal pattern I have found is that they are very shy. If you swim towards them, even if it's a 12 or 15

continued on page 88

BONAIRE

A DIVER'S GARDEN OF EDEN



INCREDIBLE is just one of the multitude of terms we've heard used to describe this portion of the Netherland Antilles Islands. Lured by such descriptive terminology, we found ourselves

standing in the departure gate of ALM Airlines, loaded to the limit with gear and cameras. At two thousand feet we had our last glance of Miami through the windows of our Boeing 727 — behind us a giant metropolis, ahead the sunny, breezy Caribbean. At last we were to experience for ourselves these much talked about islands.

The Netherland Antilles are barely a stone's throw from the coast of Venezuela, less than 62 miles. Compared to its sister islands, Aruba and Curacao, Bonaire is second in size and plays only a minor role in the Dutch economy. Its lack of natural resources has nearly eliminated prospects of it becoming industrialized or overpopulated. Aside from an oil storage complex in the northwest and the desalination plant in the south, Bonaire, unlike Aruba and Curacao, has been left entirely free of heavy industry. Some think this is just an over-advertised, over-glorified Caribbean island for flowery hat tourists. The real fact is, this island was attracting sport divers long before many of us got our first gulp of water! Its natural surroundings have lured visitors from around the world, not only to dive its incredible waters, but to roam its varied terrain and sail its blue seas.

Shortly after landing at Curacao, we boarded a British-built Twin Otter aircraft for the short hop to Bonaire.

Suprisingly we found the airport on Bonaire very modern, well designed and clean; an uncommon feature for a number of Caribbean islands, with customs and immigration officials pleasant and eager to assist. As we emerged from customs a smiling man approached, gathered half our bags and politely offered the service of his taxi. Minutes later we arrived at the Flamingo Hotel, just in time to sit down to an enjoyable meal of Yellowtail Snapper with all the trimmings.

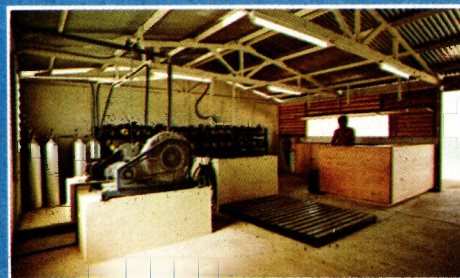
Photography and Text by Richard H. Stewart



Contrasting with the southern lowlands is the 784-foot Brandaris Peak, part of Washington National Park (right).



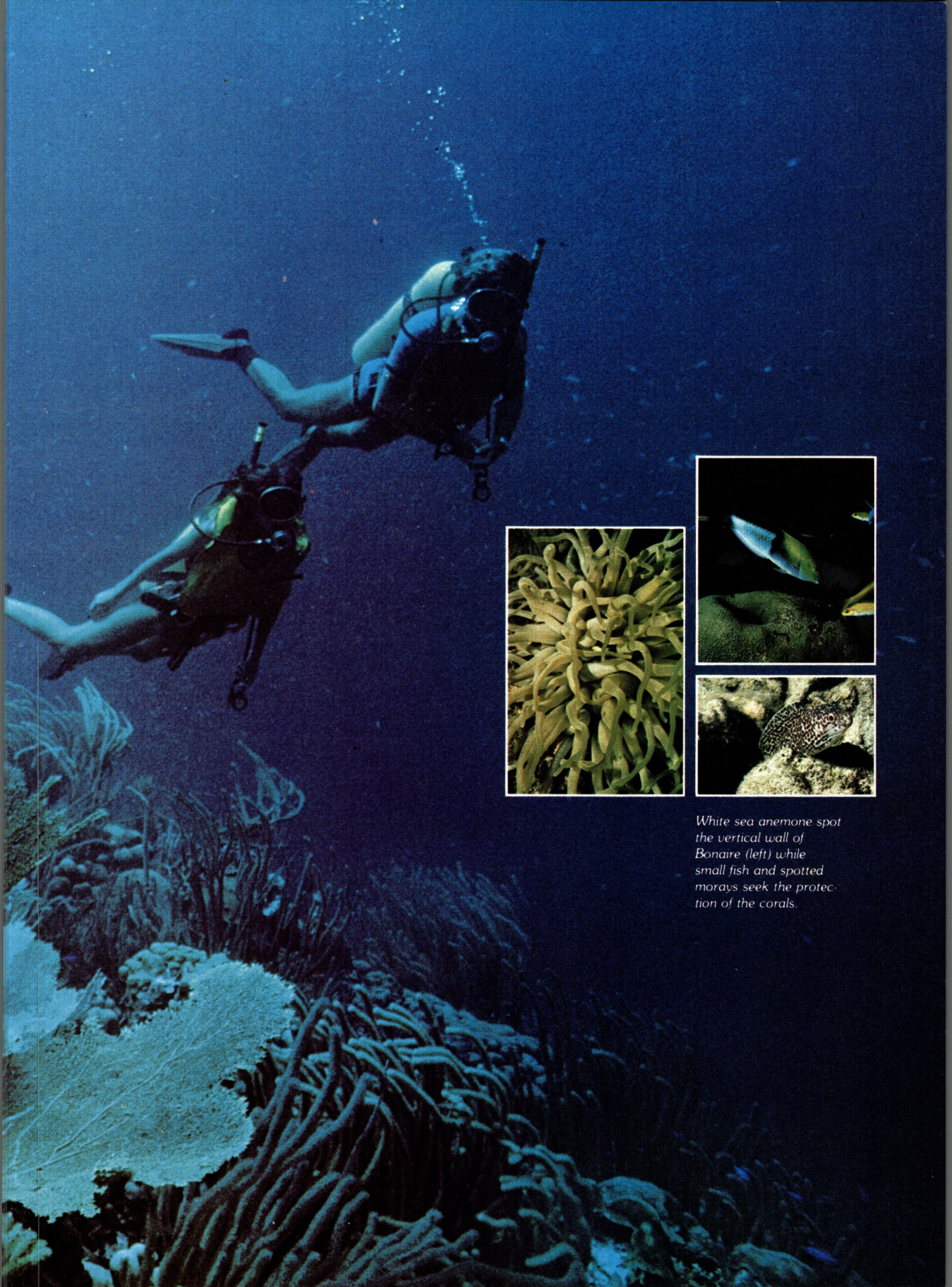
During dinner we talked with Peter Hughs, Operations Director for Teach/Tours, and his wife Alice. Their descriptions of the areas we would be diving during our week-long stay sounded even more exciting than the reports which had prompted our visit. Our enthusiasm grew as they described the various reefs and marine life we were about to see. There are two professional dive services. Captain Don Stuart, the islands' long-time resort dive shop operator, with his facility, "Aquaventures", located in the Bonaire Hotel, while Teach/Tour Dive Shop is located next to the Flamingo Hotel.



Early the next morning, after preparing our gear and cameras, we had our first look at Teach/Tours' diving facilities. The shop's clean, rough-cut wood exterior blends nicely with the ocean-front landscape, and inside: impressive! The shop's organization quickly confirmed Teach/Tours' reputation as one of the fastest growing dive resort operations in the Caribbean.

Lining one side of the shop is a sturdy rental tank storage rack holding 40 new US Diver single aluminum 80's and five new single aluminum 50's. Although it's normally recommended that visiting divers bring their own regulators, masks, fins, and snorkel, Peter has 20 new US Diver Calypso regulators and a large assortment of masks, fins, and





White sea anemone spot the vertical wall of Bonaire (left) while small fish and spotted morays seek the protection of the corals.



One of the many fine dives on Bonaire is the beach at Karpata. A winding one-lane road (bottom left, center left) leads to the isolated, cliff-ringed area. Giant tube sponges and sea fans provide food and shelter for many species of reef fish (top left). The only remnant of the plantation that occupied this site during the island's colonial days is an old stone staircase leading down to the beach (above).

snorkels. A limited number of underwater hand lights are available for those who wish to venture on the regularly scheduled night dives.

Quick air refills, always topped off are readily available from their two large Mako compressors. With a recharge capacity of 15.5 and eight cubic feet per minute, backed with twelve 3500 psi storage cylinders, they can deliver a total of 4200 cubic feet of air per minute; a system that can quickly handle any size group. In front of the tank storage racks is a large concrete freshwater fill basin, ingeniously designed with the "worn out by the end of the day" diver in mind. Tanks slide easily on wooden tracks which run into the basin for quick loading and unloading with minimal effort.

After gathering additional gear requested by the morning group of divers, Peter carefully went over the few safety rules which are closely adhered to during all dives. He showed confidence in the divers and in his

own ability to control any situation, which seemed relaxing to many. The hearty looking Scotsman has, over the years, developed an admirable professional attitude with a sincere concern for his visitors' safety, and expends every effort to assure them of a satisfying dive.

An avid sport diver while living in Tobago during the mid-50's, Peter wasted little time developing his skills, and by 1965 began working as a commercial diver. Eager to come in closer contact with other sport diving enthusiasts, he spent four years as divemaster for Camp Caruso in Tobago, where he fulfilled the YMCA instructor requirements. In 1972 Peter, with his broad professional knowledge, accepted the position of Senior Divemaster at the popular Anthony's Key Resort in Roatan before finally settling in Bonaire as Teach Tours' Operations Director.

Before loading onto the 26 foot Tri-Marine flat top boat, a last minute gear check is made. Powered by three 35 horsepower

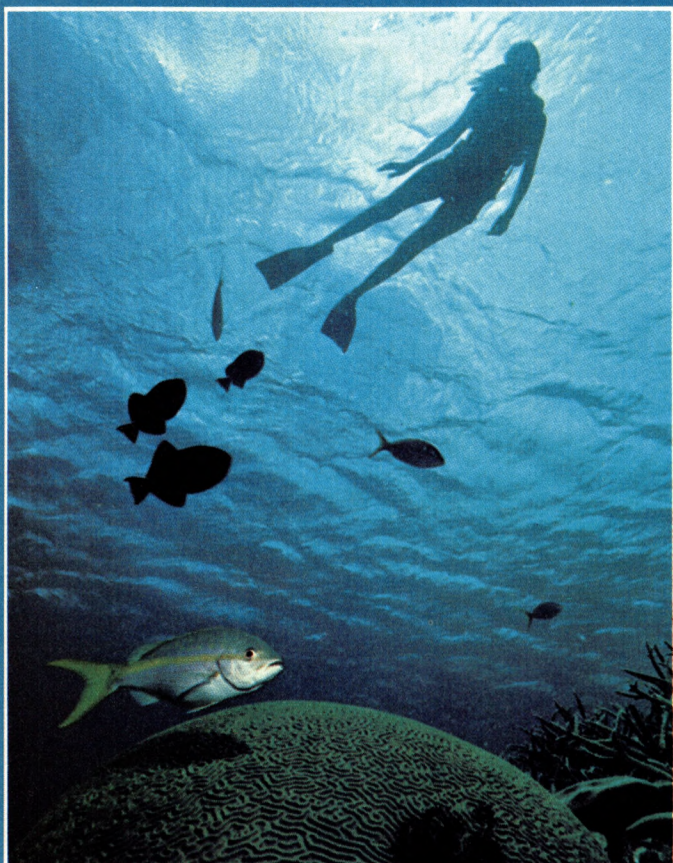


Just off the small island Klein Bonaire, Ebo's Reef presents the diver with a showcase of tropical marine life, and endless varieties of coral scattered across the ocean floor.

Evinrudes, the Tri-Marine can swiftly transport over a dozen divers to reef sites, such as those around the small island of Klein Bonaire. Less than ten minutes after leaving the dock, we were tossing the boat's anchor into the shallows around Klein, and readied ourselves to enter the area known as Ebo's Reef, named for a long time native guide from the town of Kralendijk. Forming buddy teams, we entered the water ready to slowly descend along the sheer wall. Coming to the point where the reef quickly drops out of sight, we began to see for ourselves why there has been so much excitement about Bonaire. At first we scrambled over the coral, sea fans, and giant tube sponges, dismayed to find this wasn't just a confined "good spot". It didn't take long to realize the advantages of concentrating our dive in one small area. We were fascinated by the overabundance of marine life.

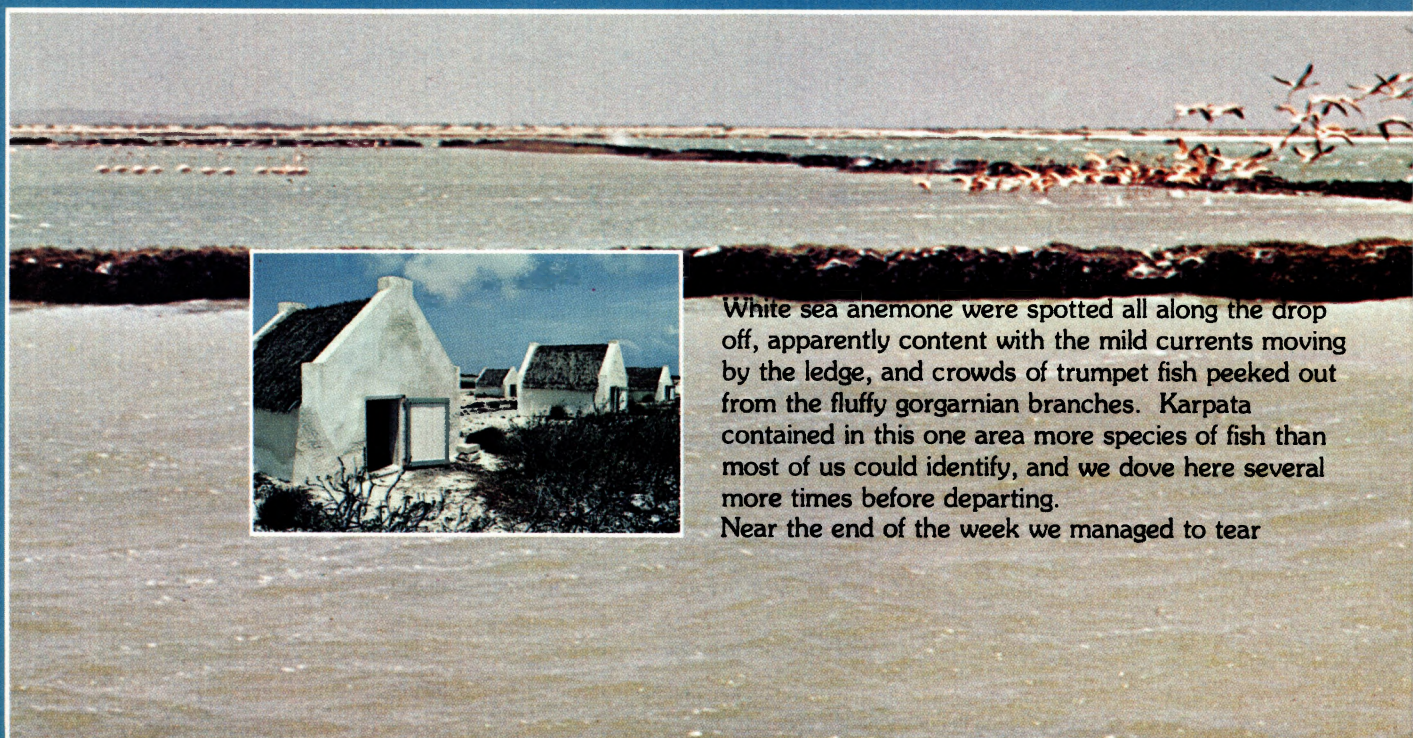
Thousands of tube worms, nudibranch, and sea anemone clung to the reef, while crabs





The prevalent yellow tail and trigger fish follow divers constantly waiting for handouts (above). Slave huts, used during the early nineteenth century still stand as a reminder of the island's past (below).

scuttled across its surface. The swarms of multicolored fish hovering nearby were not disturbed by our presence and curious, they frequently swam within arms reach. Seeking an end to this riot of aquatic vegetation we descended to 90 feet, only to find the growth there as lush as it had been near the surface. Here the bright colors appeared muted until revealed by a handlight or electronic flash. After nearly half an hour up and down Ebo's reef, we returned to the real world, moved onto the platform and shook our heads with disbelief. With all the other beautiful areas in the world, we simply wondered why we hadn't come here sooner. The days rolled by at a nice comfortable pace, and the marine life grew more incredible with each dive. For a change of scenery, Peter suggested we try Karpata, a beach dive on the northwest side of Bonaire. Loading our tanks and gear into the utility trailer, we made our way towards Karpata in the shop's 10-seater Chrysler sport van. Bordered by steep cliffs, Karpata is reached via a small, winding one-lane road. The path to the beach leads down an old stone staircase set into the face of the sheer cliff. We stood at the bottom of the steps, fully equipped while Peter explained the best way to enter the shallow sluice-like path through the urchin-riddled reef. Taking the lead, we entered the surf, staying close to the bottom and quickly made our way towards deep water as Peter brought up the rear of the group. Beyond the opening the reef drops off sharply to the right, while to the left it makes a gradual descent of several hundred feet. The blue chromis and dusky damsel fish nearly dominated a large part of this reef, which looked like an over-populated staghorn jungle. The presence of the crowding damsels seemed of little concern to the also abundant blue tang and black durgons as they moved from one area to another.

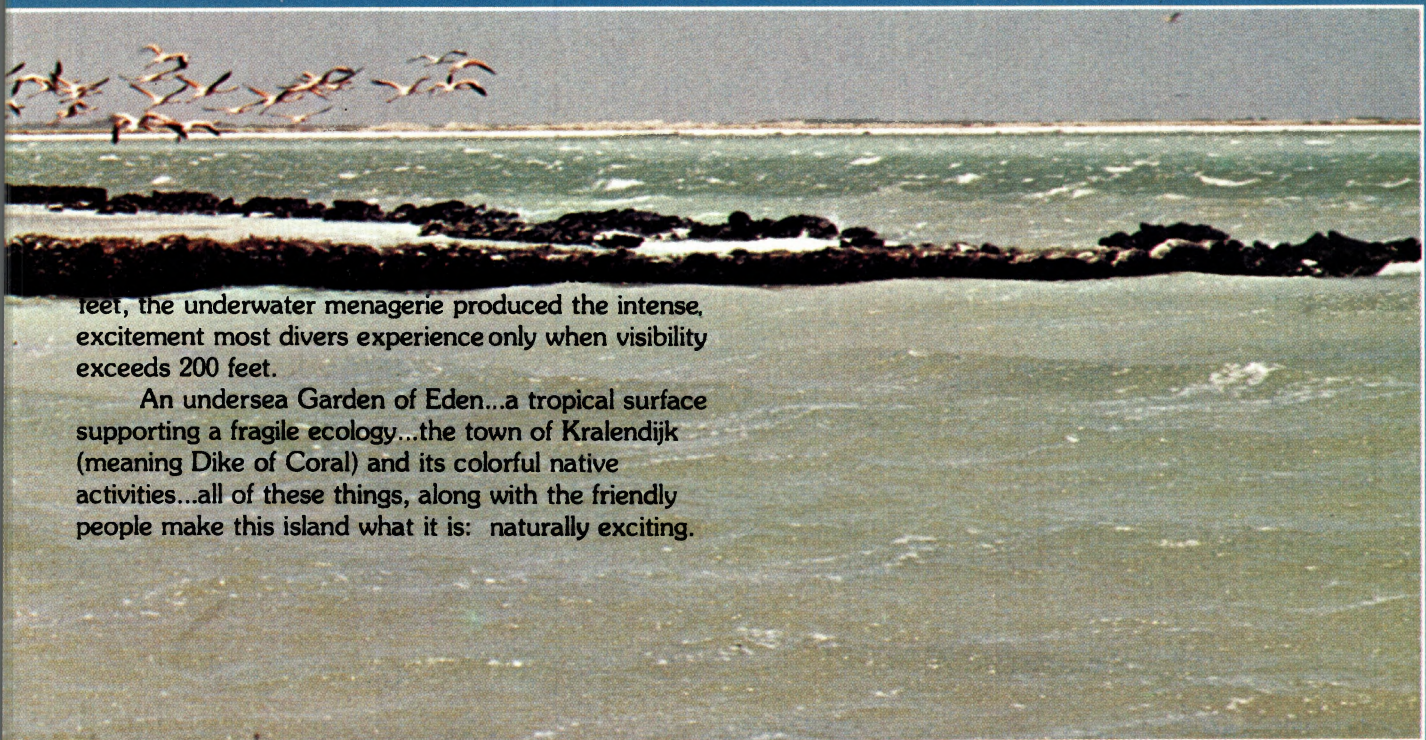
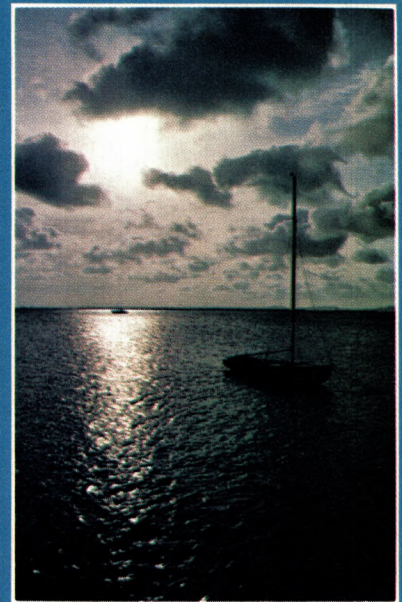


White sea anemone were spotted all along the drop off, apparently content with the mild currents moving by the ledge, and crowds of trumpet fish peeked out from the fluffy gorgonian branches. Karpata contained in this one area more species of fish than most of us could identify, and we dove here several more times before departing. Near the end of the week we managed to tear

ourselves away from the incredible undersea garden and tour the island in a rented Hertz VW safari beach car. From Kralendijk we drove southwest, through the solar salt fields of the Antilles International Salt Corporation. The company recently reactivated the island's dormant salt industry, using an ancient Chinese method of solar evaporation. This method has proved not to interfere with the island's animal inhabitants, such as the flamingos which took up residence in the salt fields while the plant was closed. Not far from the flats are slave huts, small living quarters built over a hundred years ago for the slaves who worked the salt fields.

Bonaire means "clean air" in English, but to the Arawak Indians, the island's original inhabitants, it meant "lowlands". The indians must not have noticed the terrain on the northwest side of the island, for its topography is very different from that of the south. Much of the northern part of the island is taken up by the Washington National Park. The exact opposite of the southern lowlands, this preserve surrounds the 784 foot Brandaris Peak. A 17 mile long gravel road unwinds slowly around the coast and into the interior of the park, said to be one of the first of its kind in the Netherland Antilles. A delight for naturalist and sightseer alike, the park contains some of the most interesting varieties of plant and animal life in the Caribbean.

Later, at Teach Tour, we set out for our last dive. Directed by Peter to an area known as "Alice in Wonderland" our recollections of the mountains paled as we entered this underwater fairyland. Uncommonly large sea fans, gorgonians, and tube sponges lay on a gently contoured bed of brilliant coral. Yellowtail and flatfish lounged on its surface, while silky green and spotted morays hid in the



feet, the underwater menagerie produced the intense, excitement most divers experience only when visibility exceeds 200 feet.

An undersea Garden of Eden...a tropical surface supporting a fragile ecology...the town of Kralendijk (meaning Dike of Coral) and its colorful native activities...all of these things, along with the friendly people make this island what it is: naturally exciting.

UNDERWATER NATURE TRAIL AT ANACAPA ISLAND

Sport Diver



Anacapa's marine life contrasts by comparison with the U.S. east coast.

by Peter C. Howorth

A federal underwater nature trail will be established at Anacapa Island, off Southern California. The trail, the first of its kind on the West Coast, encompasses an area nearly half a mile long and some 300 yards wide. Included in this span are reefs, caves, sandy stretches and kelp beds with depth ranges from intertidal to 50 feet. Work has begun under the direction of the Santa Barbara Underseas Foundation, with the cooperation of the National Park Service. The Underseas Foundation is a non-profit group devoted to promoting an awareness of the ocean and its importance for the future.

This trail is unique in many ways. An area protected from the brunt of the weather: consequently, making it possible to dive nearly anytime and the visibility is usually excellent; a veritable haven for sightseers and photographers. NPS has designated the area as a game preserve, installing illustrated underwater signs to point out interesting features along the trail which abounds with marine life. There are paths for skin divers as well as scuba divers and glass-bottom boats will be available soon for non-divers. In addition there are guided tours along the bluffs overlooking the trail and trained biologist to explain the flora and fauna of the island, together with the marine life beneath the surface.

The trail, only 11 miles from the mainland, is easily accessible from Ventura or Oxnard marinas where charter boats are available.

For individuals and organizations wishing to contribute to the project, permanent recognition will be given for publicity purposes. All contributions are tax-deductible. Interested parties should contact:

Santa Barbara Underseas
Foundation
P.O. Box 4815
Santa Barbara, CA 93103
(805) 966-4814



Victor Bates (Undersea Foundation)



foot shark, and swim right to it — pum — he goes right off.

SPDM: What was your most memorable experience with sharks? You described in Bonaire the incident where you thought this large object was a ship's rudder and then realized, My God, it's a shark's tail! What type of shark might it have been?

Hass: I have no idea. I saw a huge fin, too huge. Thinking back, it reminds me of the big fin of a whale shark, but I don't know whether there are whale sharks in these waters.

SPDM: Today there are very few sharks seen around the Bonaire area. Why is this so?

Hass: Yes, today they are very rare. I have been thinking about this. I have talked to a marine biology student here who said they haven't seen any sharks in over a year. In our day, in the late 30's I would say every third or fourth day we would see sharks. I wonder if it is not the activity of the divers that has chased them away.

Our final interview session took place in a Chinese restaurant on Bonaire. This is a strange place to find even one Chinese restaurant, yet there are three of them; two of them new in just the past year. This evening was one of nostalgia, of talking of earlier days. Lotte was also with us.

A few days earlier I had noticed the two snorkeling in front of the Habitat. Actually, they were not using snorkels. They took great gulps of air, submerged like porpoises, and then resurfaced to breathe a considerable time later. This is an acquired pattern of behavior. Snorkels didn't exist when they started diving, and they've never gotten around to using them. This led our talk into what equipment was available in those early days, and of what happened to Hass' three constant diving companions who appeared in so many books: Joerg, Alfred, and Xenophon.

SPDM: What was actually available in the way of commercial underwater swimming equipment when you started diving in the 30's?

Hass: Well, only these little goggles, they were French made. I think they were for some type of emergency use by the navy, for the submarine emergency exit. These little goggles existed, they were very similar to the goggles used by the pearl divers in Japan. I got in touch with the sport by meeting this American writer for *Saturday Evening Post*. So, we had a spear and these

goggles, there were no fins yet. They came out the next year at the Exposition of 1938. There was no diving equipment, no underwater cameras, no underwater guns, no diving equipment at all except these goggles, and you could get them only in a few shops in France. We hunted underwater with poles almost nine feet long, with a detachable head made by a blacksmith.

SPDM: How many fish do you estimate you have personally speared?

Hass: I? Ha! Quite a few! Because it was not so difficult. There were many big fish. When I started I sold my fish to hotels. The first year I speared about 80 fish.

SPDM: Do you have any idea how many fish you have speared in a lifetime? Any guess?

Hass: A lifetime? Well we speared certainly for food. It's a guess, but I'd say 600-800 or so.

SPDM: But now you oppose spearfishing.

Hass: Oh yes. I have for some time now. I think that all divers go through this state. They start as keen hunters and then they get interested in the animals, and watch them. Then they become hunters with the camera.

SPDM: Cousteau in *Newsweek* magazine recently was very critical towards sport divers. He called them mere "thrill seekers" and implied they were doing more harm to the marine environment than anything else. He really had very little to say about sport diving in general. How do you feel about sport divers? Are they damaging the reefs?

Hass: Well some of them probably are, by hitting the coral and so on, but I still don't think this is a heavy damage. I believe sport diving is very beautiful. The three-dimensional living underwater inspires you. That is why it is so enchanting to dive. Once you have started to dive you go on diving. It's the experience you can have elsewhere only in outer space, to be without any weight, to fly like a bird. Today we were with a group of very good divers and none of them hurt the reef. They swam about with their cameras and watched and observed. I think sport divers have become very concious about conservation. So I consider this a positive sport. I have only positive things to say about the sport.

SPDM: In Europe there is much more emphasis on spearfishing, where in the United States there seems to be

much more emphasis on photography. Why do you think there would be this type of development?

Hass: Well, in Europe you have three Roman nations. I mean you have the Italian, the French, and the Spanish and they just love to spear. They carry with them wherever they go a bundle of spears. Also out of the water they shoot birds, and they are enthusiastic hunters in general. You see in Italy it is still allowed to use alkaline for underwater hunting. This is the only country where this is allowed. In Spain and France this is forbidden, all other European countries are very concious of conservation, the German nation, the Scandinavian nation, the northern nations.

SPDM: Do you feel diving has become too easy because of all the gadgets?

Hass: No, I wouldn't say it gets easy. I mean these people we were with today were all excellent divers. They were really perfect in their outfit. And an outfit allows you to undertake more. I have nothing against it. Certainly there was great charm in naked diving as we did . . . just like a porpoise going up and down. Just with your mask, perhaps a snorkel. We never used a snorkel, we came up plop, and went down again.

SPDM: I can't imagine not using a snorkel.

Hass: In these waters I'd say we did it four or five hours a day.

SPDM: What have been your favorite diving areas around the world?

Hass: Well, I've got quite a few. I like the Red Sea very much, and the Maldiv Islands are very beautiful. On some of them you see thousands of fish and they are just beautiful. Of course the Barrier Reef in Australia.

SPDM: Are you planning trips to any of these places?

Hass: I am not really planning but something could spring up, there could be something where I am invited to go.

SPDM: Is there somewhere you haven't dived that you'd like to?

Hass: No, I mean there are places I would like to dive and would not like to dive at the same time because it would be so risky. If I were young I'd like to dive around Cape Horn. There are also extreme places in the Galapagos Islands. There is this underwater Matterhorn off California, with this lonely peak that

continued on page 117

See & Sea's World-Wide Diving Adventures

• Cozumel, Mexico

8 days—\$600.00 Plus airfare
Departures 1/22, 2/19, 3/19, 4/9,
5/21, 6/18, 7/16, 8/20, 9/17,
10/15, 11/19, 12/17

• Australia/The Coral Sea

17 days—\$2,000.00 plus airfare
Departures 10/11, 10/25

• Galapagos Islands, Ecuador

18 days—\$2,000.00 plus airfare
Departures 3/13, 6/12

• Tahiti/Outer Islands

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Departures 4/30, 6/4

• Cayman Islands

8 days—\$600.00 plus airfare
Departures 1/15, 2/12, 3/12, 4/2,
5/14, 6/11, 7/2, 8/13, 9/10,
10/22, 11/19, 12/17

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• Red Sea—Aqaba, Jordan

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Departures 5/14, 10/8

• Bonaire

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February)
Departures 2/19, 4/16, 5/21, 7/9,
8/20, 9/17

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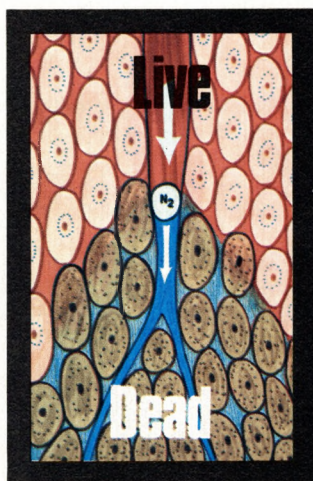
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A Hyperbaric Chamber



Enlarged diagram of Nitrogen saturating body cells (above). The single-patient chamber (below) is located at Shands Teaching Hospital in Gainesville, Florida. Windows allow operator to check patient visually, while intercom facilitates voice communication (opposite page).

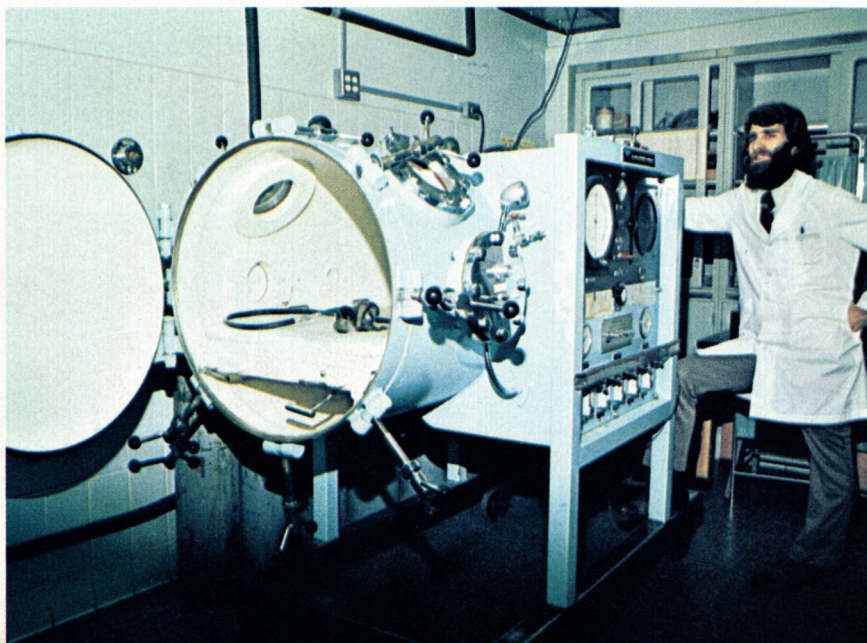
One of the heaviest possibilities the sport diver must consider is the chance of contracting decompression sickness, more commonly known as the "bends".

As the diver descends he breathes air into his lungs at a pressure equal to that of the surrounding water. These gasses are then released to the blood stream through the alveoli. The amount of gas dissolved in the blood depends on the depth and duration of the dive. During the process of respiration the pressure exerted on the lungs allows dangerous amounts of nitrogen to go into solution in the blood stream. The "bends" occur when this excess of nitrogen is improperly eliminated from the body.

If ascent is too rapid, proper elimination cannot take place. If the ambient pressure is reduced too quickly a serious difference between the tension of nitrogen in solution and the tension of outside pressure on the cell walls will occur. This unequal pressure allows nitrogen gas to come out of solution.

Bubbles of this gas are then released into the blood stream and surrounding tissues. Once these bubbles of nitrogen develop, their size and location will determine their effect on the diver. As the bubbles travel through the circulatory system they tend to localize in the joints and cartilaginous areas of the body. This localization, and the intense pain it produces, results in the diver not being able to straighten the joints. He is literally "bent" out of shape.

One of the first things taught to student divers in the north central Florida area is a particularly important telephone number. Many instructors require memorization of this number before they will proceed with the first lesson. This is to stress the importance of knowing where the nearest decompression chamber is. Locations of local hyperbaric facilities should be required knowledge for all sport divers. This telephone number, 904-392-2838, puts you in direct contact with the Department of Respiratory therapy at Shands Teaching Hospital in Gainesville, Fla.



Richard H. Stewart



The director of this department, Dave Desautels, is also the executive director of the National Association of Cave Divers and, of course, a very experienced diver in his own right.

One of Dave's many functions as head of respiratory therapy is the operation of the decompression chamber. This chamber is one of the few located in Florida; there are others in Panama City, W. Palm Beach, Miami and various other cities throughout the state and the southeast. However, the chamber in Gainesville is in a state sup-

ported hospital and their fee for treatment is significantly lower than non-state supported chambers.

Though the number of chambers in Florida and the southeast is small, the incident of treatment in Gainesville requiring chamber facilities is relatively low. On an average they treat two patients every three months, which is exactly why the cost of treatment is so high. It requires a considerable amount of money to house and maintain a decompression chamber. Average cost of the treatment at Shands Hospital is

The schoolbook aspect of diving is just as important to the veteran diver as it is to the novice. If you fudge on the decompression tables, you could get canned (below).



seventy-five dollars per hour. If you include hospital stay, lab reports, and doctors' fees the total could easily come to a thousand dollars.

The decompression chamber in Gainesville is a single man, single lock chamber. Consequently, no access is possible while the patient is under pressure. Communication is maintained with the therapist by microphone, but vital signs are not monitored. No meals can be brought in either. These factors limit maximum operation to six hours. Behind the machine are three large

compressed gas tanks. One tank pressurizes the chamber, the second tank supplies oxygen to the patient, and the third mixes air with the oxygen to prevent O₂ poisoning.

The patient wears a mask that works on the same principle as a demand regulator. It covers the nose and mouth and is securely fastened behind the head. Once properly secured in the chamber, the patient is recompressed. The nitrogen in his system slowly dissolves back into solution and in time he is gradually brought back to

normal surface pressure. As the decompression takes place, the patient's blood returns the nitrogen to his lungs where it is released normally, through respiration.

During a recent interview with Dave, we discussed such things as diving accidents, their treatment, rate of incidents, and possible long-term effects of decompression sickness. The time that elapses between when the bends occur and when the treatment occurs is not very crucial. A significant

continued page 119



Face mask (above) supplies oxygen-air mixture to patient during treatment. This is a single-lock chamber, so there is no access to the patient during treatment. This limits the maximum operating time to six hours per session.



Richard H. Stewart



FLORIDA'S JOHN PENNEKAMP UNDERWATER PARK

by Gary Osgood



photography by Bill Crawford



A warm wind combed the bending palm trees and the clear water lapped hungrily at the shore. Glittering reflections of sunlight on the water filled our eyes as we loaded gear aboard our dive boat. The sounds of rustling leaves, bird calls and the chattering of small animals were much the same as those you might hear anywhere in the Caribbean, however, we were not on any far away island.

This island is part of a group; composed of scattered hammocks, tidal marshes, and dry soil, they form the lower tip of the Florida peninsula, trailing off into the sea. They are known simply as the Florida Keys.



Over the years the Keys have been host to thousands of divers who travel from all parts of the States and many foreign nations in search of sun, fun, and an exciting dive experience. Approximately an hour from Miami via U.S. 1, out of state divers flying into Miami International will find car rentals at a very reasonable price. Several small airstrips are located on the upper Keys for those who wish to fly direct via private aircraft. Most of the dozen or so dive shops in the upper Keys operate their own charter boats in and around John Pennekamp State Park, where some of the finest diving is less than 30 minutes from the dock.

Fortunately, for those who haven't seen the Keys and for those who enjoy returning regularly, steps were taken years ago to preserve the natural beauty of this area. Located off the eastern edge of Key Largo is the John Pennekamp Underwater State Park, an aquatic preserve administered by both the State of Florida and the Federal Government. It is illegal to remove anything from the park, with the exception of lobster during season. Spearfishing is not allowed, for the protection of the fish community and to preserve all of the native species for the benefit of future visitors.

At Molasses Reef the diver finds mounds of thick coral 15 and 20 feet across, and hordes of curious fish nosing in and out among the rubber suited invaders, looking for hand outs. To the south stands the statue. Firmly embedded in Elkhorn corals, Christ reaches up to the heavens, majestically posing for the never-ending click of shutters. The statue was donated to the Underwater Society of America by a European named Cressi; it stands serenely, an ageless memento of his admiration for the Keys.

During the Big War, as a number of boat captains call it, German U-Boats made numerous sweeps along

the coast. The fate of the Benwood ended here, her 300 foot hull torpedoed, she settled to the sandy bottom in 50 feet of water. Later the hulk was wired with dynamite and demolished. Enough of the labyrinthine structure remains to make an excellent afternoon exploration.

Near the Benwood is an area that shows no sign of any wrecks, with the exception of one relic, a cannon. Encrusted with marine growth, it blends with the surroundings as if it were meant to be a natural part of Elbow Reef. For the exploration minded, French Reef is just as exciting as the other Pennekamp reefs, with an extra touch: caves and crevices run through the piles of coral. Approach with caution however, for the caves not only protect the small from the



large, but the large from the even larger forms of marine life; and as always, one should keep hands out of holes to avoid eels.

Who says you can't make it to the islands this year? The Florida Keys are easy to reach, relatively inexpensive, and filled with excitement in and out of the water!

Before taking off for the Keys, call or write one of the area dive shops listed below. Reservations are a must during peak seasons.

SPDM GUIDE TO PENNEKAMP PARK AREA DIVE SHOPS.

American Diving Headquarters
Rt. 1, P.O. Box 274-B
Key Largo FL 33037
(305) 451-0037
Harry Keitz, Owner

Aquapro, Inc.
Mile Marker 91.5 P.O. Box 720
Tavernier, FL 33070
(305) 852-9206
Dick McConnell, Owner

Bill Crawford's Tiki Isle Dive Shop
Mile Marker 103.5 P.O. Box 755
Key Largo FL 33037
(305) 451-1063
Bill Crawford, President
Charlotte Crawford, Vice-President

Capt. Cliff King
Scuba & Snorkel Tours
227 Tavernier Drive
Tavernier FL 33070
(305) 852-5616

Capt. Steve Klem
Underwater Guide Service
P.O. Box 1803
Key Largo FL 33037
(305) 451-1831

Carl Gage's Diving Center
US Hwy 1, P.O. Box 38-11
Key Largo FL 33037
(305) 852-5764
Carl Gage, President
Tom Wolfe, Vice-President

Coral Reef Park Company
J. Pennekamp Coral Reef Park
US Hwy 1, P.O. Box 13-m
Key Largo FL 33037
Randy Pegram, Owner
Dave Ireland, Scuba Shop Mgr.
(305) 451-1621

Dive Boat "Annie Up"
P.O. Box 1335
Key Largo FL 33037
(305) 451-0005
Capt. Tom Guarino

Dolphin Diving School
Mile Marker 95, P.O. Box 1397
Key Largo FL 33037
(305) 852-3625
Noel Crouch, Owner
Reba Crouch, Mgr.

Holiday Inn Scuba Shop
Route 1, Mile Marker 100
Key Largo FL 33037
(305) 451-3483
Bob Klein, Owner

Key Largo Diving Headquarters
Route 1, P.O. Box 293
Key Largo FL 33037
(305) 451-1151
Dave Lindsay, President

Ocean Divers, Inc.
US Hwy 1, Mile Marker 99.5
P.O. Box 1113
Key Largo FL 33037
(305) 451-0286
Bob Arnold, Owner

Ocean Divers North, Inc.
Mile Marker 104
Key Largo FL 33037
(305) 451-0057
David House, Mgr.

Ocean Reef Dive Shop
Ocean Reef Club, Inc.
Key Largo FL 33037
(305) 367-2611, ext 4312
Tiny Wirs, Mgr.

Sea Dwellers Dive Center
P.O. Box 1796
Key Largo FL 33037
(305) 451-3640
Larry Bateman, Co-Owner
T.J. Holub, Co-Owner
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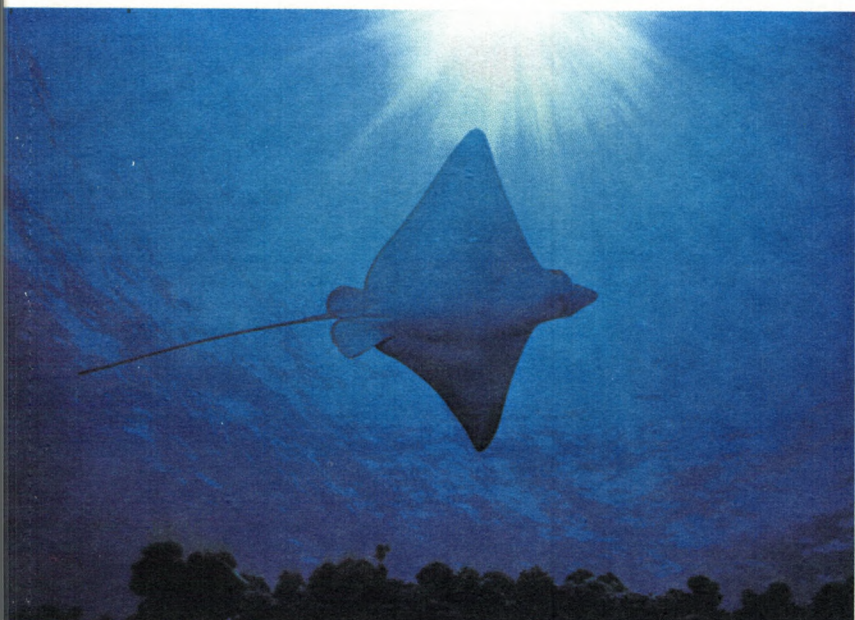
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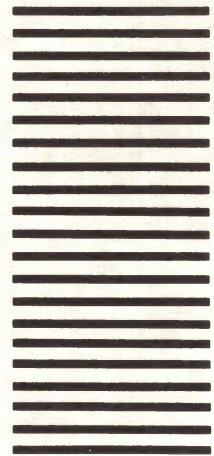
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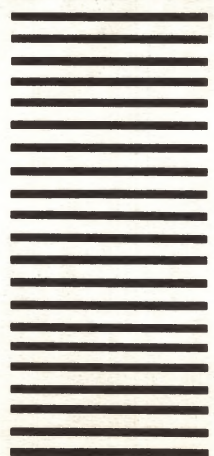
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Destruction of a Coral Reef.

con't from page 25

The reefs exist in a state of dynamic change where the balancing factors are the interactions between species. Competition and predation play extremely important roles in determining the species composition of a reef. In removing any link, the system falters, then readjusts accordingly. With enough pieces being removed there is no ecological "room" in which to maneuver and the reef becomes permanently damaged.

An important part of diving is getting to and from the dive site. In Florida this means a boat. Every boat that visits the reef drops an anchor which usually damages some organism on the bottom. Anchor damage to the reefs in Pennekamp Park may be the single most significant factor disrupting the reefs. Other boat damage to reefs, such as wrecking on the reefs, runs a close second. An estimate of the number of boats on Molasses Reef falls between 30 to 50 per day, or 10,000 to 15,000 per year. On some days as many as 150 boats have been counted on the reef at one time. If each boat anchor damages only a small square of reef, 100cm square, the subsequent damage adds up to approximately five percent of the total area of Molasses Reef each year.

Estimates of the number of divers and snorkelers in the park each year run between 100,000 and 300,000. The average diver in the park seems to be a person with an average amount of diving experience and very little on and around coral reefs. With the number of people diving on the park's reefs a program must be instituted by the state and dive shops so the reefs will be here for the next generation to enjoy. 🐠

LITTLE CAYMAN PACKAGE TOURS

Little Cayman Adventures Ltd. and Red Carpet Flying Service are now offering a package tour to Little Cayman Island. The price includes round-trip airfare from St. Petersburg/Clearwater airport, St. Petersburg Florida, accommodations at the Buccaneer's Inn on Little Cayman, and the services of three professional dive guides and two dive boats. Little Cayman is just south of Cuba and offers some fabulous diving, including the Little Cayman Wall, a reef that plunges over 750 feet into the Caribbean. For information write: Robert Larson, Little Cayman Adventures Ltd., P.O. Box K85, Land O Lakes, Florida, 33539. Telephone: 813-872-8416 or 813-949-7507.

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A diver in silhouette is shown against a blue background with bubbles. The diver is holding a rope and is positioned in the center of the frame. The text is overlaid on the image.

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IN THE NEWS

SEX DRIVE OF DIVERS

Are male divers sexier than the average man? Dr. Joseph Reusch, President of the German Lifesaving Association and a diver himself, thinks so. He says this is because divers take a remarkable quantity of oxygen into their blood when they dive. This gives a boost to their sex lives on dry land.

The doctor is proposing to use this knowledge by inviting patients to step into a 15 foot high recompression chamber and take them down to a simulated depth of 120 feet. In three minutes, says the doctor, the patient will be breathing a far higher concentration of oxygen than usual. He claims that in cases of impotence the results have been truly staggering.

DIVERS SEE IN DARK WATER?

One of the problems of deep water diving is the reduced light intensity. This obviously cuts down the diver's ability to see. A possible solution to this problem may be the use of image intensifier systems, such as those used by night combat forces in Viet Nam and by astronauts on the moon.

The intensifier system is placed in front of a regular diving mask. Such intensifiers can multiply the level of available light up to 10,000 times. An experimental system has been developed, but its range is limited to 35 feet. If the electronic and cost problems can be overcome, such systems may be available to divers, hopefully in the near future.

WHAT SIZE WAS THAT SHARK?

The maximum length of the white shark was established at 36.6 feet in 1870 by A. Gunther, and this figure has been generally accepted. However, John E. Randall of the Bernice P. Bishop Museum in Honolulu, Hawaii says this is a gross exaggeration. He states that reexamination of the jaws and teeth of the specimen referred to by Gunther, and comparisons with the jaws of white sharks of known length reveal Gunther's shark to have been about 17 feet long. The largest white shark

reliably measured was found near Cuba and measured 21 feet. Shark bites on whale carcasses found off southern Australia suggest that white sharks could grow as long as 25 to 26 feet.

FLOATING MESSAGE BOTTLES ALSO AID OCEAN SCIENCE

The German Hydrographic Institute in Hamburg Germany keeps a collection of more than 600 bottle messages. Dr. Jurgen Meyer, a curator of the Altonaer Museum in Hamburg, says there are probably more than 10,000 bottles containing messages floating on the seven seas. Some of these bottles may have been bobbing around for a century or more.

The Ocean Post Museum of Hamburg, which was destroyed during World War II, used to have a bottle that had been afloat for 52 years. The bottle was cast into the sea by a German South Pole Expedition near the island of Kerguelen. It was found more than 3,000 miles away. Another bottle was tossed into the sea in 1784 by a Japanese treasure hunter whose ship was wrecked on a Pacific reef, but the rescue of the message writer and his shipmates was not too practical, as the bottle wasn't found for 150 years.

The longest bottle traveller on record was thrown into the Indian Ocean near Tasmania by a German scientific expedition in 1929. A current going east carried the bottle to the southern tip of South America where it was picked up by a ship, recorded, and thrown back into the sea. The bottle eventually drifted around Cape Horn into the Atlantic, and floated into the Indian Ocean, passing the spot it had started its long journey. In 1935 the bottle was retrieved off the west coast of Australia. The bottle was in the water 2,447 days and drifted 16,800 nautical miles.

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EELGRASS USED AS GRAIN

Zostera Marina, or eelgrass, is harvested in the spring by the Seri Indians along the Gulf of California in the state of Sonora, Mexico. It apparently has been an important part of their diet and culture for centuries. Botanist Richard Felger of the University of Arizona and linguist Mary Dakota learned of this practice recently during botanical studies of the area.

The Seri harvest the eelgrass in April when large quantities of the plant are floating loose close to the shore. They spread it along the beach to dry, then pick out the seaweed and debris. It is toasted and ground into flour. The flour is cooked with water and made into a gruel. Usually the Seri eat the gruel with other food such as sea turtle oil or honey. Some of the grain is stored for consumption during the rainy season.

Eelgrass grows along the coast of North America and Eurasia. Felger reports that "eelgrass has considerable potential as a general food resource for mankind. Its cultivation would not require fresh water, pesticides, or artificial fertilizers."

"MERMAIDS" CLEAR CANALS

Water-dwelling mammals called manatees, some weighing 450 pounds, were sometimes mistaken for mermaids by ancient mariners. Strict vegetarians, adult manatees consume from 60 to 100 pounds of seaweed every day. 70 manatees are being used to keep the canals of British Guiana clear of weeds, saving the government thousands of dollars.

MEASURING GROWTH OF CORALS

Researcher R.P. Bak of the Caribbean Marine Biological Institute in Curacao has developed a device which is carried to the desired depth each month by a scuba diver to weigh a colony of coral. The pieces of coral species previously were broken free from the main coral trunk. The weighing procedure does not disturb the coral. This accurate measurement of coral growth may greatly advance the study of coral reefs.

continued from page 33

Aluminum was selected for the basic building material because of its light weight, strength, and freedom from the rust and rot that afflict other materials. The light weight would mean greater speed and more load carrying capacity, and the strength of a modern marine-aluminum hull is absolutely amazing. On September 30, 1976 the *SPIRIT OF ADVENTURE*, on a shakedown cruise, was in the harbor at La Paz, Mexico when hurricane Lisa struck with 150 mile per hour winds and nearly leveled the city of La Paz. For more than five hours the boat and crew fought the storm. Visibility was so limited that collision with other wildly careening boats was only avoided through the use of radar. The boat was finally blown through a steel trestle pier, reducing the pier to scrap metal, and was driven onto the beach by the hurricane-force wind and waves. This would have totally destroyed a wood or fiberglass boat, and many good boats did meet their end that day. The all-aluminum *SPIRIT OF ADVENTURE* was pulled off the beach after the storm abated and brought safely more than 900 miles from La Paz to San Diego. No repairs were necessary prior to the long return trip. Although several thousand persons lost their lives to Lisa, not one passenger or crewman aboard the *SPIRIT OF ADVENTURE* was injured.

Back at the Poole Boat Co., in Chula Vista, California where the superboat was originally built, repairs to the superficial damage inflicted by Lisa were soon completed, and in February the *SPIRIT OF ADVENTURE* began service in Hawaii. Needless to say, her owners are justly proud of her sturdy


construction. You can leave your bulky dive gear at home when you visit this boat in Hawaii. On board are 70 aluminum, single 80's with weights and backpacks. Two hi-speed compressors pumping up to 6000 psi and three receivers provide plenty of well-filtered air. There are four easy exits into the water and a huge submerged swim-step to use when returning to the boat. Circulating salt water mask-rinse wells at each exit, sturdy scuba tank racks and personal dive stations add to diving convenience.

Barely under 100 tons gross, 86 feet long and 25 feet wide, she rides solidly; there is very little seasickness aboard this boat. It's just as well because the *SPIRIT* is equipped with a custom designed, solid stainless steel galley from which emerge some truly fine meals. This showcase galley is complemented by a large comfortable lounge furnished as an English pub. There is also a refrigerated salad bar, and soft drink and coffee dispensers to provide snacks between meals.

Other vital statistics include a cruising range of 2500 miles, space storage for 10,000 gallons of fuel, 4,000 gallons of fresh water; six hot, fresh water showers, a large refrigerated fish hold, two freezers, four refrigerators, a total of 100 k.w. of electrical power with 110 volt convenience outlets available virtually everywhere. Three V-12 Detroit Diesel engines provide the main power.

There is a Serry auto-pilot system, navigational radar, depth finders, automatic direction finder and an assortment of other radios and electronic gear.

Anyone who wants further information about the *SPIRIT OF*

ADVENTURE and her Hawaiian vacation cruises can write to Pacific Sportdiving Co., 4014 Anaheim Street, Long Beach, California 90804. 

UNDERWATER FILMS

The Australian Tourist Commission has several 16mm color sound films available for free loan to diving instructors and other diving groups, and are available from Modern Talking Pictures, Inc. The company has several offices around the country and certain films must be ordered from a specific office.

Titles Available:

"The Great Adventure", No. 30309
Charlton Heston narrates a journey through the South Pacific, climaxed by the final destination, Australia. 57 Minutes. Available from the Los Angeles office only.

"South Pacific Adventure", No. 30320
A shorter version of The Great Adventure. 27 minutes. Available from both Chicago and Philadelphia offices.

"Will the Great Barrier Reef Cure Claude Clough?" No. 30317. A fantasy on the theme of a holiday as a cure for all ills. Filmed in and around the Great Barrier Reef. 15 minutes. Available from Los Angeles office only.

"The Living Wall". This film covers ecological development of a coral reef and is in the nature of a documentary consisting mainly of above water footage with some underwater subjects included. 30 minutes. Available from Los Angeles office.

"Big Country - Beyond Reach". Ron and Valerie Taylor at work. 38 minutes. This film is available only direct from the Australian Tourist Commission in Los Angeles and New York. A written application is required detailing proposed use and audience type. Introductory notes, maps and support literature are usually supplied with the film. Bookings are heavy and early request is advised. Australian Tourist Commission in Los Angeles is located at 3550 Wilshire Blvd., Los Angeles, CA 90010 and in New York at 1270 Avenue of the Americas, New York, NY 10020.

The offices of Modern Talking Pictures are:

Philadelphia: 1234 Spruce St.,
Philadelphia, PA 19101, (215)545-2500.
Chicago: 1687 Elmhurst Rd., Elk Grove
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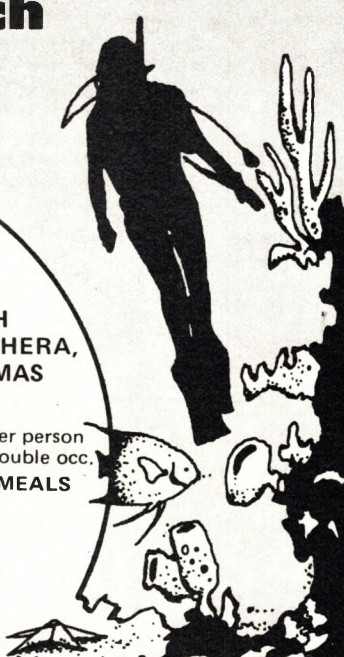
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Instructor Notes

by Jim Hollis



Richard H. Stewart

As summer approaches, skies turn blue and clear, temperatures rise, and the warm blue depths of the ocean call to the sport diver. The lure of the deep is indefinable to those who have never been diving, and irresistible to those who have. The sea becomes a natural part of the diver's life and seems to mold itself around his daily schedule.

However, before we don our suits and grab our dive bag, shouldn't we all give thought to something we've probably overlooked? What's that?, you say. Well, look harder at that regulator. It's not as new as it was last year. The mouthpiece is worn and will probably leak. How long has it been since your tank was checked for maximum pressure, or since your C.P.G. has been used.

While we're looking, take a glance at the body that's wearing this gear. I'm sure the long winter months have taken their toll on that slim, fit figure of last summer. After all, the holiday feasts of turkey and dressing are not low-cal and the nap afterwards certainly settled it.

Over the past few months your memory has taken a rest too. Do you remember Boyle's Law, Nitrogen Narcosis, or how to use the decompression tables? The school book aspect of diving is just as important to the veteran diver as it is to the novice trying to get his certification.

Getting back into shape will be the hardest part for most forgotten divers. When you took the original swim test to become certified, you were most likely younger and had been practicing for the

200 yard swim. Well, now it's up to you, not your instructor, to see that you can make the grade physically. Jogging, faithful exercise and of course ten laps in the pool every night will certainly put you well on the way to becoming fit again. I'm sure you remember how hard it was last summer to swim against the current to your buddy when he needed help. Even the best divers occasionally become separated from the dive boat and have to kick back with their arms full of shells or camera gear. Catching lobsters is much easier when you feel fit and can maneuver around their crevice homes with some agility.

Don't forget, one of the most important parts of physical fitness is that it allows for better air consumption and longer dives. It also lessens the chance for a mishap, such as decompression sickness (commonly known as the Bends). The U.S. Navy Standard Decompression Tables are based on a standard, normal, physically fit man around the age of twenty. Most of us will have to admit we weren't *that* fit when we were twenty.

For those of us who are not too keen on books or homework, the review of the chemical laws and the physical properties of diving will present some difficulty. The best way to achieve some sort of competence in this part of diving is to pull out the textbooks you used during your basic training, call the local dive shop to see if any revisions have been made, and study. It's not necessary to memorize each table and law. Satisfy *yourself* that you have a working knowledge of the information. Feel confident that if called upon to make a quick decision concerning the depth at which to decompress or the proper way to give C.P.R. you would make the right choice. The only test you will have to meet will be in the water and not in class. It might be a good idea to review with your usual dive buddy. His knowledge is just as important to your welfare as yours.

The easiest part of the diving review is your equipment. As an experienced diver, you are familiar with your gear and how to use it. You have probably purchased a lot of your gear as custom-made; or at least suited for your body size, the type of diving you prefer, and your physical strengths and handicaps. There is really nothing *new* to learn about your gear. There is, however, something old to consider.

“Probably one of the most reminded-of rules during a pool class: safe and proper tank storage.”



Diving gear ages rapidly with continual use. It takes a proverbial beating, more so than the equipment used in any other non-contact sport. Depending on the frequency of your diving trips, chances are that your gear is either in need of repair or replacement. This is where your professional dive shop plays a role. Not only can the dive shop operator make the necessary repairs to your equipment, he will do them efficiently and correctly. He can also advise you on any purchases you may need to make. Since he has been kept current on all innovations made in the diving industry in the last year, he can show you the changes made in present gear and the new gear on the market.

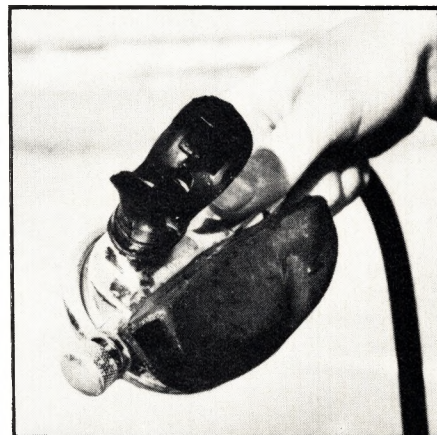
Your tank is probably in need of visual inspection to insure it isn't rusted or corroded. If your tank was not originally purchased within the last five years, it may also be in need of a hydrostat check to test the amount of pressure it can withstand. Your regulator should be checked over, or possibly overhauled. This again should be done by a trained professional with the proper replacement parts and know-how. The straps on your mask and fins should be checked to see if

they can be stretched without breaking. Every experienced diver knows spare buckles, straps, weights, and accessory gear should be close at hand, in case of any type of emergency.

Now for a few tips for the underwater photographer, to prepare his equipment for the first summer dive.

Remove *all* O rings from the Nikonos camera housing, strobe, and other housings, and check them for cracks or dry-rot. If no evidence of these problems is found, then lubricate with silicone grease or spray. If using spray, *do not* spray directly on the O rings. Spray your hand and fingers, then massage the O ring with the spray from your hand. Also, *do not* use the spray on plastic housing. The chemical contents will cause the housing to crack!

All strobe and/or camera batteries should be replaced after a year of sitting on the shelf. Be sure to check the strobe sync cords and the E/O connectors for corrosion. If corrosion is found on these or the Nikonos filters, they can be placed in pure vinegar for 15-30 minutes, rinsed under clean water to dilute the vinegar,



Richard H. Stewart

and dried off. This solution will cleanse the build-up of corrosion.

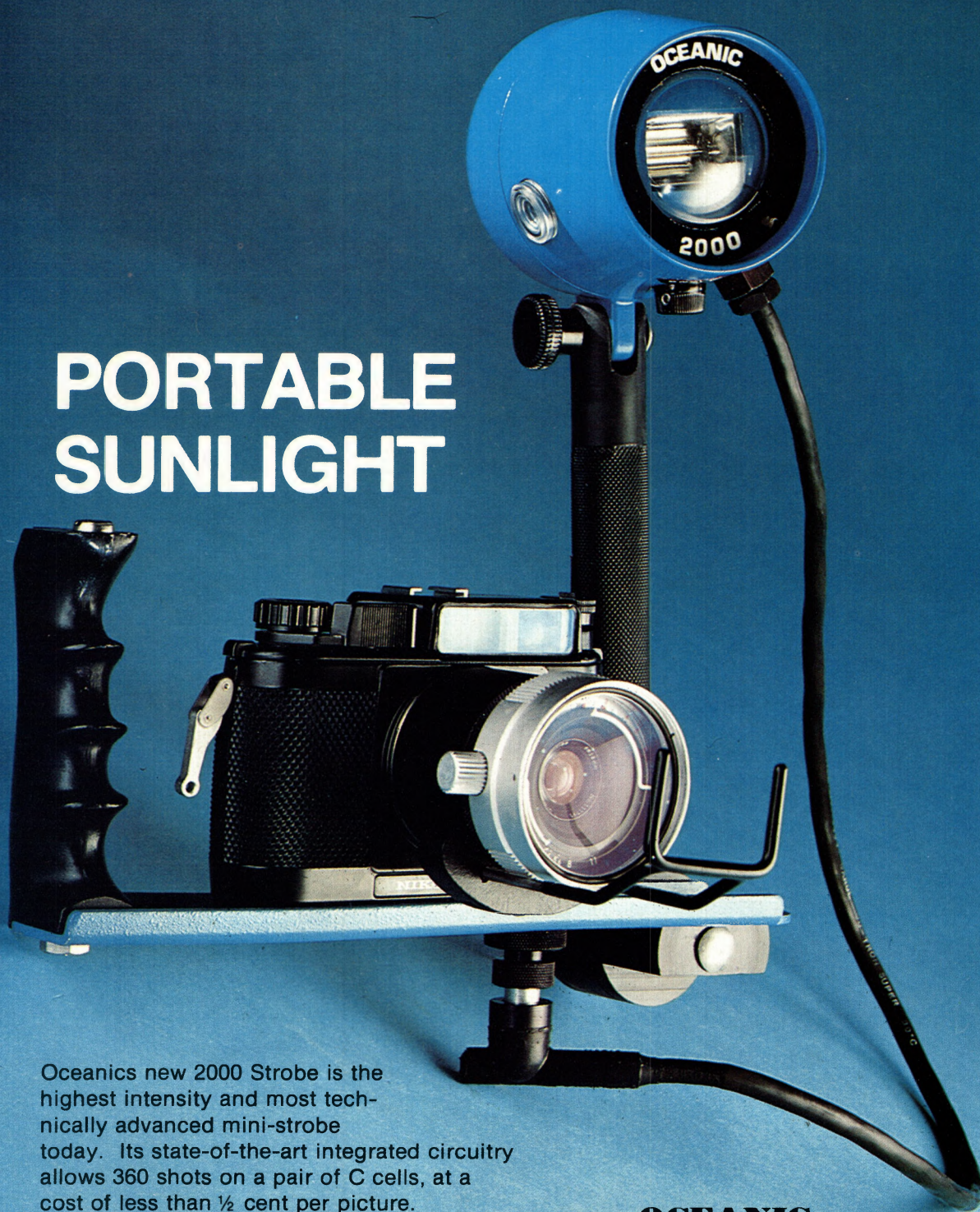
From past experience I have learned it's better to check and be sure; when you see water in your camera or strobe...it's too late!!

Last and most importantly, the forgotten diver should re-evaluate his current diving buddy. Very often, the diver in training casually picks up a partner in class. This partner usually becomes the first diving buddy. But, as the diver progresses and becomes more proficient in his diving skills, he may outgrow his original buddy. Their interests in diving may begin to differ greatly or the interest of one may disappear entirely. Whatever the reason, care should be taken in either remaining with the buddy you have or in choosing a new one. Remember, a good drinking buddy is not always a good diving buddy.

We have reviewed the basic needs of the diver about to begin another unforgettable diving season. You'll only get out of diving what you are willing to put into it. Let's keep diving fun, safe, and accident free, and remember.....

STAY WET!

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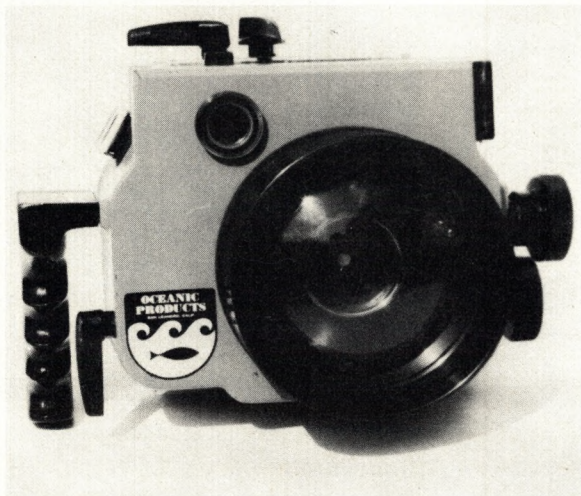
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Understanding Underwater Photography

Underwater photography can be an exciting addition to the already thrilling sport of scuba. It can permanently capture the beauty of our underwater world with all of its fascinating creatures and seascapes, allowing us to relive our experiences time after time in finished print. Non-diving friends can enjoy the fruits of the sea without ever wetting their feet.

Usually the first thought that comes to mind, when the overwhelming urge to learn underwater photography occurs is the expense! How much will it cost and will I enjoy it after the cash outlay? Actually, the answer is relatively easy to derive by simply determining what you can afford! Can you spare more than \$1000, or \$400, or does under \$100 fit your budget?



by Richard H. Stewart

graphy with the Instamatic you presently own? There are several excellent underwater housings manufactured by Ikelite, producers of high quality plastic cases for most popular brand Instamatics. These housings are available at most local pro dive shops starting as low as \$39.95.

Learning with an Instamatic may not produce award winning photographs, (although higher priced Instamatics are capable), but important techniques such as camera and housing maintenance, camera handling coordination and composition are all important subjects to understand as they are applicable to the use of more sophisticated equipment.

Ikelite's pocket Instamatic housing with flash grip provides one step controls for the beginner. (Opposite page inset) Versatile and compact, the Nikonos offers a choice of four lenses from the 15mm to the 80mm. SLR camera owners will find the Ikelite high impact plastic housing available for most brand cameras, or can move into the aluminum alloy Oceanic housing, known for its rugged construction and ease of controls. (Left)

Even though the expense is the major decision, photographic knowledge and experience must also be considered. Are you a "hot to go" amateur photographer already equipped with the latest 35 mm camera equipment, or do you simply enjoy snapping pictures with an inexpensive Instamatic? If you're the latter of the two, why not begin the learning process of underwater photo-

The Instamatic and plastic housing probably offer the most practical and inexpensive way to fulfill the urge to learn underwater photography, and at the same time stay within a practical budget. There is always that chance that you may not enjoy underwater photography as you may have thought, in which case the housing can be sold for a minimal cash loss. On the other hand

you may totally enjoy it, as thousands do, and soon wish to trade up to a line of equipment that will produce quality photographs and has available an assortment of accessories.

This being the case, the most popular move is up to a Nikonos, a totally amphibious underwater camera manufactured by Nikon. The Nikonos, a 35 mm viewfinder camera, is kept dry by a series of rubber "O" rings throughout the camera. Its main features are the assortment of interchangeable lenses (15mm, 28mm, 35mm, and 80mm), assorted close-up tubes, and the popular 35mm film size is available nearly everywhere.

For those who own a single lens reflex (SLR), or would rather invest in an SLR for topside use, another alternate would be to purchase an SLR housing. For less than \$150.00 you can buy a rugged, dependable plastic housing for most brand name cameras. There is a substantial savings by using one system for underwater and topside photography, even though there is always a chance of leakage, which is almost unheard of if the equipment is properly handled and maintained.

For those who further wish to reduce the possibility of flooding and are willing to invest a large sum of money, Oceanic Products Hydro 35, an aluminum alloy housing, is truly the ultimate design in non-plastic housings. Available exclusively for the Canon F-1, or the Nikon F-2, the Hydro 35 features effortless focus, shutter, aperture and shutter release controls. A larger, brighter image can be obtained by using the speedfinder attachment with the Canon or Nikon. Although this housing is a favorite among professional underwater photographers, it's not out of reach for the serious amateur who is wishing to achieve the ultimate photographs by coordinating quality equipment with a knowledge of techniques.

NAVY DIVER

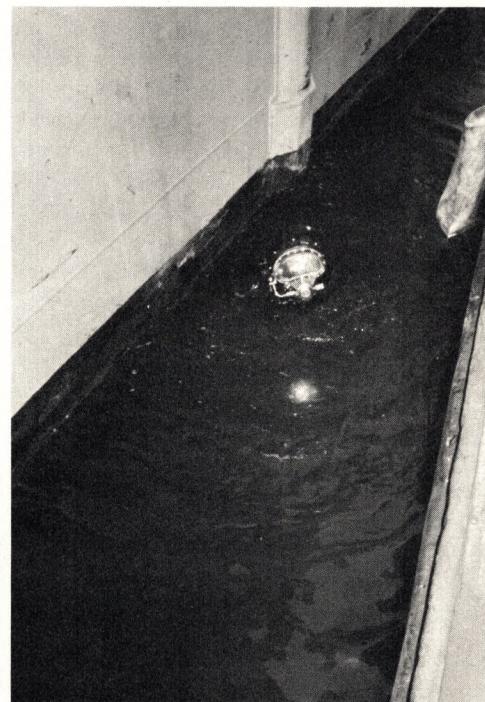
REPAIR AND SALVAGE

It was near one o'clock in the afternoon. The cold air that had crept in during the night dampened what would have otherwise been a pleasant 50° day. The crew aboard the utility boat prepared for the afternoon assignment. From the looks of their pre-dive organization, one would have suspected that this job was going to be something special. As the crew made ready their gear, the boat drew alongside a massive steel hull. It was a fast frigate cruiser in need of minor repairs. After its recent tour of the Mediterranean, the ship's anti-submarine decoy device, or Prairie System, needed a thorough cleaning. The thousands of holes which comprise the under-hull section of the system were clogged with barnacles and other marine growth.

Over the loudspeaker a mechanical voice boomed "There are divers in the water! Do not attempt to operate any



suction or discharging equipment." The divers going over the side were already beyond range of the voice, preparing themselves for the



strenuous job of cleaning the thousands of tiny 3/64th inch holes, using a small drill bit to clear them of debris.

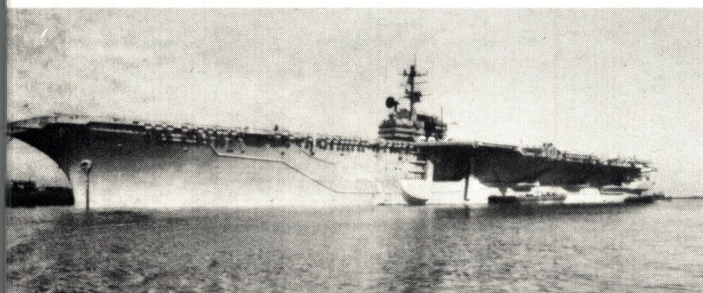
The team working this job

are members of the Naval Repair and Salvage Division, which comprises almost 90 per cent of the Navy's underwater manpower. The remaining ten

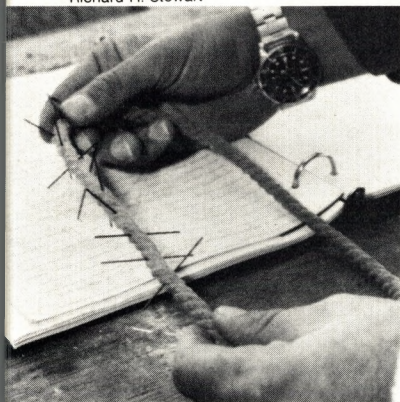
per cent are in non-salvage positions such as the Seal Teams, underwater demolition, or exploration and research. During the eleven weeks at boot camp,

these men were trained on scuba, Kirby/Morgan, and hard hat, to familiarize them with the equipment used by the Navy. Although most of the basic training is with the hard hat, most of the working assignments require the use of a Kirby/Morgan system. With scuba, doing repairs on a large ship like a carrier can be as risky as diving in a confined tunnel. It can become difficult to determine the true direction to the surface while inside the mammoth football-field size hull.

The "on the job experiences" of a Navy diver can range from cleaning pinhole systems to repairing or replacing the screws on a carrier. Generally, the Salvage Division crew agreed that their Navy jobs were giving them a variety of tough and intricate assignments, building experience which would be useful to them in the future as civilian commercial divers.



Richard H. Stewart




Divers of the Navy Repair and Salvage Division handle jobs as varied and complex as cleaning the underwater sensors of a ship's submarine-decoy system or replacing the screws of a carrier. Complex problems often require a simple solution; a rope is used to keep track of small drill bits while underwater.

Photography tells the story



And, underwater photography means Nikonos — the only 35mm camera designed for use without a housing at depths to 160 feet (as well as above water).

Here, a diver is using it to secure positive identification of underwater wreckage. Elsewhere, Nikonos-equipped divers are examining off-shore pipe lines, tracing pollution sources, aiding ecological and archaeological studies — each providing the all-important photographic record.

Ruggedly built by Nikon and equipped with famous Nikkor optics for needle-sharp, true-color photographs, the Nikonos III is also surprisingly easy to use. And there's a whole system of Nikonos lenses and accessories to help get you the pictures you need. At Nikon camera dealers and selected dive shops. Or, write for Lit/Pak N-24, Nikon Inc., Garden City, N.Y. 11530. Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada, Anglophoto Ltd. P.Q.) 

Nikonos III

the amphibious camera from Nikon

continued from page 67

Lining the perimeter of the fantail are three extra propeller flukes, securely fastened against rough seas. Dropping over the stern at 190 feet, the port of registration comes into view: Midland, Ontario. Below lies the rudder and the screw, stripped of her flukes. On the upper deck, near the stern mast, sit four huge cooling ventilators leading to the engine room.

Switching to the dive lights, penetration of the engine room reveals the massive 1500 horsepower engine. Sitting parallel to the steam engine rests a pair of generators, used to supply electricity for the "Emperor". Under a catwalk used by the engineers who took care of her, one sees evidence of the explosion that ripped the boilers when the cold water surged in. As you further explore this area you notice that many of the instruments and pressure gauges, used to check ammonia levels for cooling, are intact. Most indicate the very numbers they had when the "Emperor" found her final resting place.

Feeling we have overstayed our welcome, we ascend from the depths up her mast to our ride home, only to find that our dive isn't over.

DECOMPRESSION is a must after a visit to the stern of the "Emperor". Following our lines up, we waited out our time at the predetermined decompression stops. Perhaps two hours after our visit began, we were ready to bid the "Emperor" of Isle Royale goodbye.

The "Emperor" has been good to me. She welcomes my friends of the diving world with open holds and gaping hatches. Although she's as friendly as they come, and welcomes all who visit her, deep down she possesses the ability to overtake and keep you as her permanent guest.



Follow *Sport Diver Magazine*, as Rick Frehsee reports on the... "Cousteau Mystique".

Look for the summer issue of *Sport Diver Magazine*.

What Is UPS?

What is UPS? A determined group of dedicated divers and photographers who give freely of their time and energy to encourage amateur and professional photographers.

Who may join UPS? Anyone who has or expects to have an underwater camera and is a diver. Interested photographers are particularly encouraged to join the group. If you are not yet a diver, diving lessons are available most everywhere. The local UPS chapter can direct you to a competent instructor or see your local dive shop.

What does joining UPS do for me? Membership in any professional or non-professional organization accrues benefits to you in proportion to your own personal contribution of time and energy. A newsletter is published monthly carrying news of chapter activities and articles of interest to underwater photographers. Annually the key event is the International Underwater Photographic Competition and Exhibition. The hallmark of underwater photographic competitions, the oldest of its kind, is a project of UPS well worth great pride of the members. A major portion of incoming funds from all sources is devoted to this exhibition, which is dedicated to all underwater photographers everywhere; its scope is worldwide.

Must I live in a particular area of a UPS chapter to be a member? Definitely NO! UPS membership is not limited to one region. We have members as far away as New Zealand, Sweden, Canada and the Grand Bahamas. The greatest concentration of members is in California, but we have the nucleus of other chapters beginning to form in other sections of the United States and abroad.

What activities does UPS offer other than the exhibitions? Each chapter runs its own affairs as far as activities are concerned. These activities usually include excellent programs of general and local interest, films, speakers, technical sessions, and field trips. Intra-chapter photo contests throughout the year are also a prime function. An excellent working relationship exists between chapters, and an answer to almost any problem can be found somewhere among our membership.

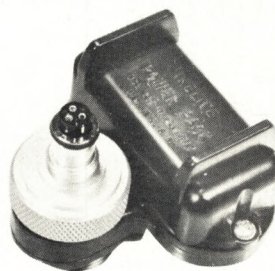
Specifically, the UNDERWATER PHOTOGRAPHIC SOCIETY works to: exchange knowledge and information among members, promote the overall field of underwater photography, study advanced techniques and equipment in the field, offer training to members in underwater cinematography and still photography, help preserve the underwater environment, provide opportunities for practical group photographic activity.

These goals are accomplished through monthly meetings which feature films, speakers, contests, and instruction; workshops for in-depth study of photographic techniques; monthly chartered dive boat trips to photogenic underwater areas in the channel islands, ship-wrecks, caverns and reefs; international contests and exhibitions to provide examples of exceptional underwater photography for fellow divers, diving photographers and the general public; and chapter tours to some of the world's most exotic diving spots.

Where can I find out more about UPS? Contact the Los Angeles chapter Headquarters at 15440 Sherman Way, #213, Van Nuys, California 91406.

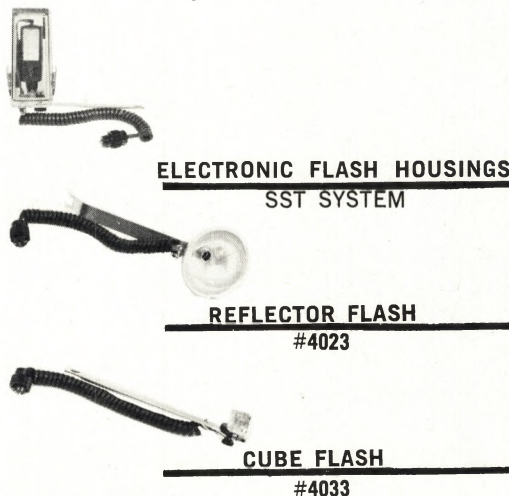
IKELITE SST SYSTEM

We have given up trying to get enough power from the weak and undependable strobe synch circuit to fire strobes underwater. All IKELITE strobe housings for 1977 will feature a SOLID STATE TRIGGERING (SST) device. The SST will be powered by a 22½ volt battery/capacitor located in our camera housings or in our new NIKONOS POWER PAC. The 22½ volt B/C power supply produces a dependable voltage to the SST device in the strobe housing. The B/C power supply produces ten times the power required to trigger the SST device, insuring dependable firing, even through long connecting cords in a wet environment.



NIKONOS POWER PAC

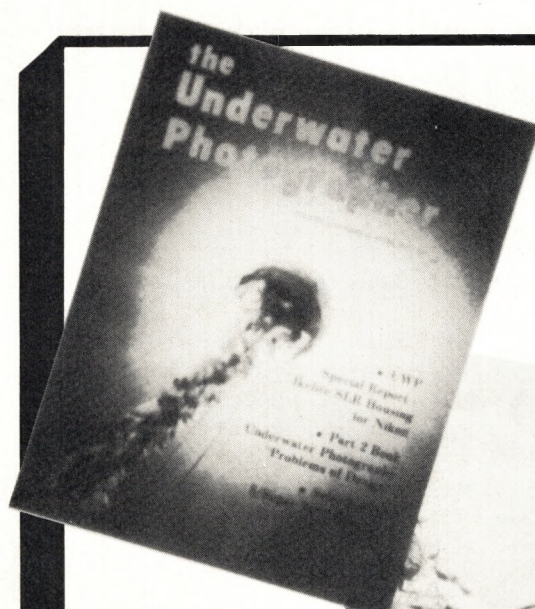
The NIKONOS POWER PAC is a small connector system, incorporating a 22½ volt battery/capacitor. The POWER PAC is used to trigger the SOLID STATE TRIGGERING (SST) device in the new IKELITE strobe housings. With just a twist of the dial the POWER PAC can also be used to power IKELITE flash units using flashcubes or flashbulbs.



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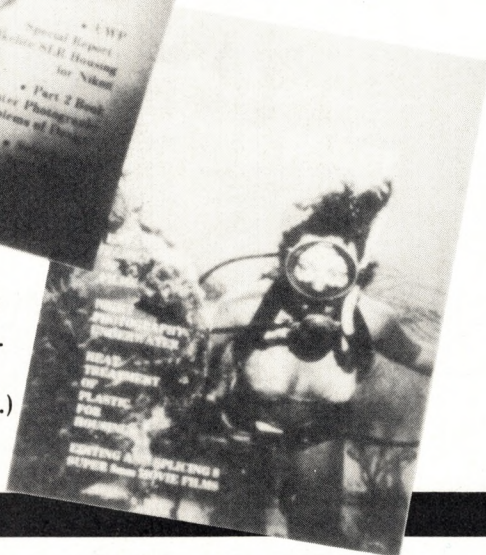


Underwater Photographer

The magazine devoted to the growing number of skin and scuba divers looking for a means of enjoying and retaining a part of the underwater world with minimal impact on the ecology. This magazine devotes space each issue to articles of interest to both the beginning and advanced photographers, tapping technology useful to all photographers be they land or undersea oriented. Ask for it at your Pro Dive Shop or order direct. Back issues are \$1.00 each.

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ON THE LEGAL SIDE . . .

A new publication for divers concerned about the legal aspects of their sport:
LEGAL ISSUES FOR FLORIDA DIVING

Sport Diver

by George Conger and Clark Wheeler. Mr. Wheeler is a graduate of the law school at the University of Florida and a faculty member at Sante Fe Community College in Florida. Mr.

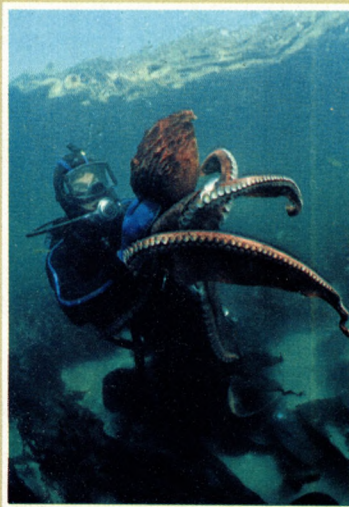
Conger is a certified scuba instructor and an administrator at Sante Fe Community College. Price is \$3.95 from W/C Publications, P.O. Box 1216 Gainesville, Florida 32602.

A Sea Story

As told by
EMERSON MULFORD

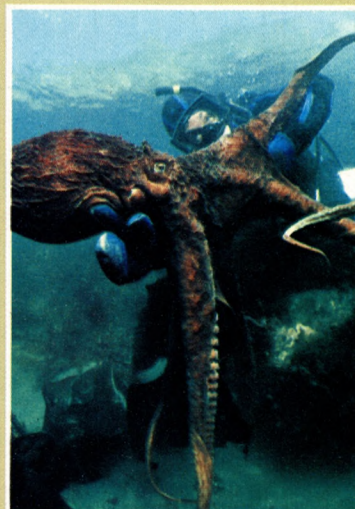
I knew I was being
watched. I could feel . . .
but where was it? The visibility . . .
less than ten feet and closing. I felt alone;
closed in. Yet, somewhere . . . beyond the limits
of my sight . . . behind the green haze
that surrounded me . . .
I could feel the animal's presence."

A cold wind blew over the bridge that morning. The sea, grey and rolling, became one with the horizon. We lay at anchor, still in the water. Below, I could make out figures moving on the deck. Now and again, patches of fog would silently remove them, leaving only voices and the hum of equipment. It had been a strange year. The unexplained sighting off Newfoundland . . . how could such an animal live in those deep waters? Then, a June sighting off Baja California, this time the animal coming into shallow waters. And finally . . . here in the southern Puget Sound, off Washington . . . One poor fisherman reported an animal "twenty feet long and red with rage" that tore nets, booms, and rigging "clean away." Another report described the animal as having tremendous strength being "as white as the ghost of Neptune." Conclusions about the animal's size were impossible. Only one thing certain: it possessed tremendous strength.

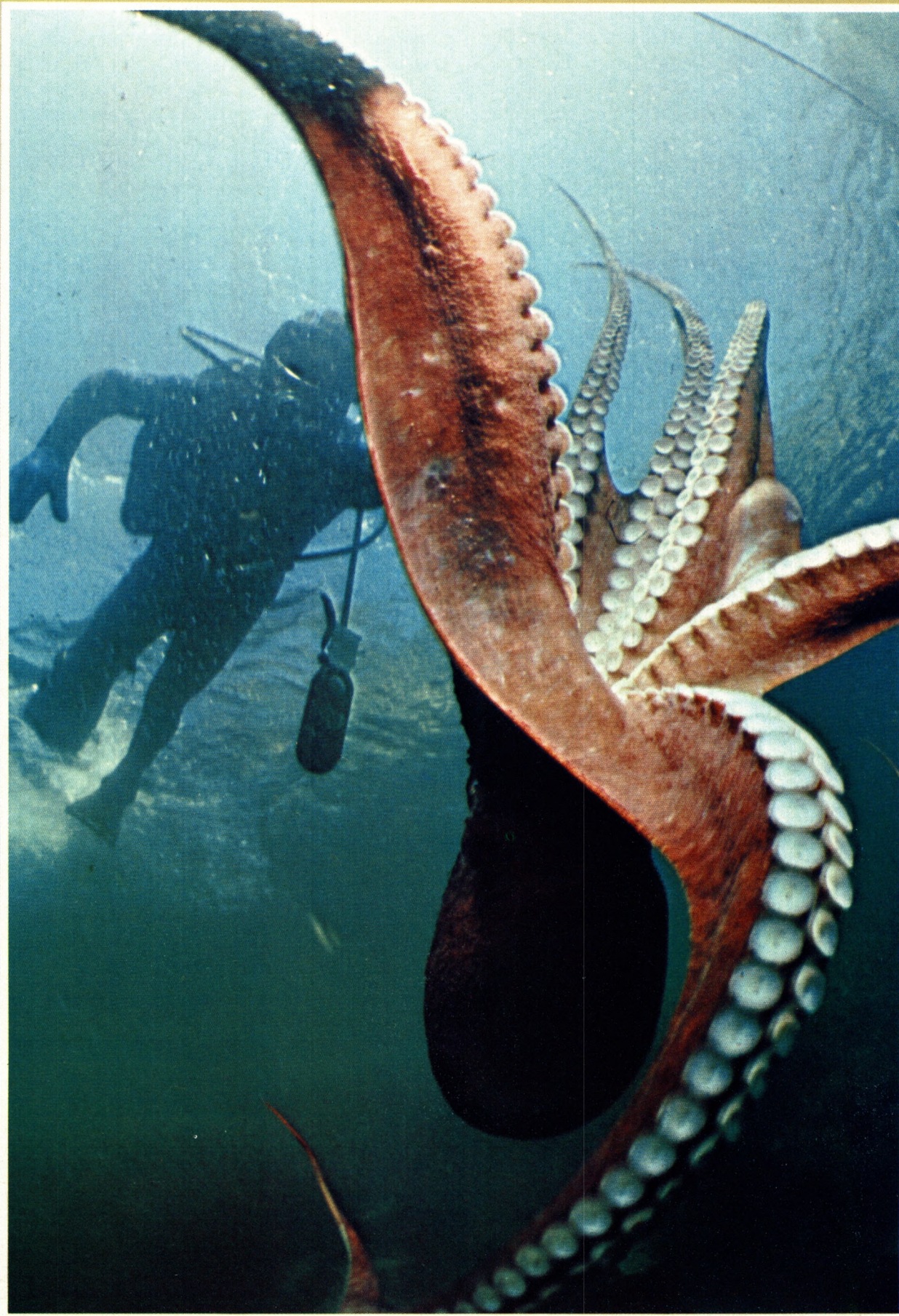


Emerson Mulford

"My diving partner, Scott Fitch, an authority on the local animal life, started towards the animal's last known position. Making a quick, last minute camera check, I took a deep breath, then followed his lead."



I couldn't believe my viewfinder! Out of the green depths of this sea story swam Scott . . . the sea monster cuddled in his arms. My aperture went crazy! My focus confused! Was it the extreme depths, or perhaps too much . . . ?



Moving aft along the bridge and down the starboard passageway, I edged onto the main deck. Equipment was scattered. Testing and last minute triple-checks were just being completed. Nothing must go wrong now.

I crossed the deck to the photographic dive platform. There lay my tools: cameras, lighting, meters, station ropes. Everything had been checked and rechecked.

My diving partner, Scott Fitch was an authority on the local animal life. Knowing the waters better than anyone, Scott had volunteered his services. Scott's stories of twenty-foot monsters lurking in these dark green waters put me on edge. Yet there was something in his smile.

Slipping overboard, we quietly entered the water. The equipment aboard our vessel was silent. Nothing must disturb the creature we sought.

Our dive site was along the east bank of the Tacoma Narrows, in a shallow area called the Flower Gardens. Descending, we settled onto the bottom in just twenty feet of water. The surroundings were magnificent. Reds, oranges, and yellows grew from every rock and crevice. The area was alive with color.

Scott abruptly started towards the animal's last known position. His movements jerked me back to reality. Making a quick, last-minute camera check, I took a deep breath, then followed his lead.

We hadn't moved twenty feet before something . . . call it a sixth sense, or perhaps a premonition, made me stop. I knew I was being

watched. I could feel . . . but where was it? The visibility here was less than ten feet and closing. I felt alone; closed in. Yet, somewhere, beyond the limits of my sight, behind the green haze that surrounded me, I could feel the animal's presence. Too late! Scarlet red and at least fifty feet across, it descended. Ducking several of its outstretched tentacles I moved backwards, only to find myself held by yet another clinging arm. Twisting frantically, I wrenched myself free and swam quickly down and behind a boulder. The monster moved toward Scott. It was as if the bottom had exploded upward. Mud, gravel, kelp, everything rained down through the water. Scott was gone, the animal too. All that remained was . . .

I couldn't believe my viewfinder! Out of the green depths of this sea story swam Scott . . . the sea monster cuddled in his arms. My aperture went crazy! My focus confused! Was it the extreme depths? Or perhaps too much . . .

Whichever, it didn't matter. All that mattered now was getting pictures of this sea monster which Scott had somehow managed to romance right into his arms.

Then suddenly, as if by command, the monster was up. Twenty tentacles outstretched, its body flashing red, then orange. I jerked my camera up and focused.

We swam back in silence, each alone with our thoughts. Rolling over the side of our zodiac, I set my camera in the bow and turned. Scott was sitting on the transom smiling broadly. In our silence, without a single word, we both knew what a great sea story this was going to make.



A HOPEFUL VISION
by Carl Roessler

Perhaps we humans are by our very nature incurable optimists, but the growing popularity of underwater photography and diving tourism give the hopeful impression that a new second-generation diver is appearing on the scene.

In the early years of sport diving, only the strong stayed with the sport. In an odd way, the sea put off those who might have helped resist its rape, and attracted many for which shows of manhood and strength were all-important. The first purchases of those early divers were invariably flippers, mask, snorkel and speargun. It is an unfortunate fact that the killing of fish--or other animals for sport has always been necessary to satisfy certain primitive impulses in many men.

Over the years other manifestations of first-generation diving man's propensity for rape and pillage produced other "sporting" underwater activities. The ripping up of slow-growing black coral trees throughout the tropics was the macho activity of many first-time traveling divers. And how many homes are decorated with the bleached skeletons of corals torn from the living reef? Or pretty shells whose occupants were pulled out with hooks.

The dual tragedy of the last twenty years is not only the toll of the sea's precious life forms, but that those first-generation divers missed much of the incredibly complex beauties of the "jungles" through which they stalked.

Hopefully, the times have begun to change. Many influences such as a generally growing conservationist sentiment among the entire public, and television and magazine coverage on the nature of the sea and its inhabitants have aroused the innate curiosity of divers. This curiosity, this growing intellectual hunger to understand the enormous tapestry of undersea society has crystallized in the new sport of underwater photography.

As I said to start, perhaps it's mere optimism on my part, and there may well be more macho and more damage before the second-generation diving man fully emerges. But I feel that the urge to show one's skill by understanding a creature rather than killing it, by bringing home its portrait rather than its corpse, will be the hallmark of maturity in future divers.

With luck, the reefs of the world will see increasing numbers of curious observers and photographers. Their minds and eyes rather than spearguns and goodie bags will take in the incredible mosaic of form, color, and social interaction that is the undersea world. We may yet leave the wonders we were given intact for the pleasure and wisdom of our children's children.

Now available... The worlds of

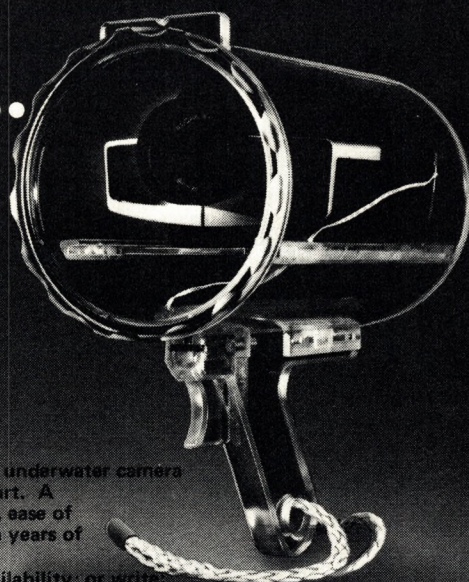


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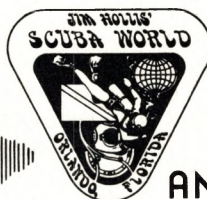
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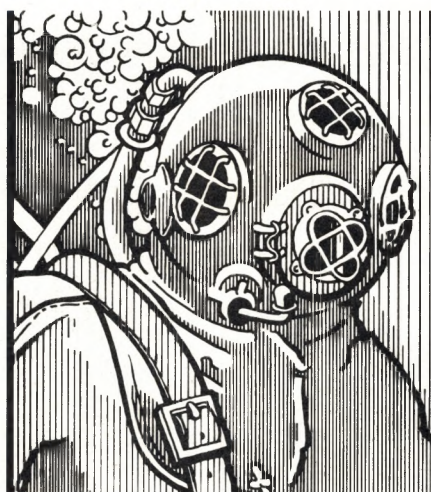
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IUC IN NEW YORK

The PROFESSIONAL DIVING SCHOOL OF NEW YORK began classes in August 1976, offering a 13 week course in Professional Deep Sea Diving. This curriculum includes Working Scuba, Surface Supplied Diving and Underwater Work Techniques, with an introduction to Bell and Mixed Gas Diving. Seamanship is taught by the Coast Guard Auxiliary. Courses in Professional Gas Rack Operator and Professional Inspection Diver are also offered. The School is the Diver Training Division of International Underwater Contractors, Inc., and is located on the same waterfront premises at 222 Fordham Street, City Island, New York 10464 (212) 885-0600.

The School recently acquired a 650 ft double lock deck decompression chamber, 1000 ft twin-sphere diving bells, and associated control and support equipment from Tarrytown Labs, Ltd. This system, which for many years served as a manned diving research facility, is used as part of the School's training facility. Both the bells and the deck chamber have been installed on the School's 33x100 ft seagoing barge. The bells are used to perform bell lock-outs in Long Island Sound. The double sphere construction of the bell system allows the instructor to be present in the upper sphere while the student performs lock-out. In either case, the instructor can lend assistance much quicker than if help had to be brought from the surface. The deck chamber is also mounted on the barge and is used for oxygen and pressure tolerance tests, and training in chamber operation and decompression.

Both the bells, and deck chamber have a significant amount of diving history associated with them. The deck chamber was built in 1964 for the decompression from the Link Man-in-Sea II 432 ft saturation dive, and in 1965 was used for the world's first saturation exposure to outer continental shelf depths—650 ft. The bell system (Purissima—named after the California peninsula) was also built in 1964. Designed by Dan Wilson (now President of Sub Sea International), it was the first of the modern series of diving bells, comprising part of the Ocean Systems ADS-I system.

The School intends to expand to include an Advanced Mixed Gas/Bell Diving course and a Diver/EMT (emergency medical technician) course. Construction has begun on a new building to house the deck chamber and the control and training console, as well as the School's wet training tank. The wet training tank facility will consist of one 33x60 ft pool, one 33x40 ft wet welding tank, and one 33x40 ft wet tank that can be "muddied" and cleared, varying the water visibility from clear to "zero" visibility.

Andre Galerne, President of IUC and the School, feels that some commercial diving schools do not offer the basic courses necessary to train a professional diver. This is one of the main reasons why he decided to open his own Professional Diving School. He feels that divers must become intimate with the sea, and that the importance of physical fitness must be stressed in the school's curriculum. Another reason for starting the school was to build a reservoir of well trained divers from which IUC could choose the "best". Galerne founded the world's first major commercial diving company (Sogetram of France) in 1950, and the first commercial diving school in 1954. He came to America in 1962, and founded International Underwater Contractors, Inc. (IUC), one of the most advanced and experienced firms in construction diving and salvage. IUC International Inc. was formed in 1970 to provide diving services in support of offshore petroleum operation outside the U.S. They presently have offices in New York, Scotland and Singapore. It should be noted, that under his direction, all of his diving companys have maintained a perfect diver safety record. He feels that properly trained divers is a crucial aspect of maintaining this record.

The first class has graduated and the top two students are presently working for IUC, Inc. and IUC International.

continued from page 88

comes up. If I were younger the Caicos Islands north of Galapagos, now there are really big sharks there, hammerhead sharks and tremendous currents. Today, with more sophisticated equipment, you can risk more. I would love to use an Electrolung to go to deeper regions and visit some wrecks. I have always been very romantic in this respect. I love out of the way places. On the other hand, I am not taking so many chances anymore.

SPDM: Do you feel the future of sport diving is more along the line of some oxygen mixture than the compressed air we've been using? I seem to get that feeling from your writings.

Hass: No, no. We used oxygen at first, but I don't think the aqualung is for the normal diver. The Electrolung will probably stay too expensive for a diver. Otherwise there certainly are some interesting developments; the kind of recycling that is done with a computer and all that. But I don't think the sport will go back to oxygen equipment.

SPDM: Why didn't you decide to manufacture oxygen equipment after the war? You had the chance to do so.

Hass: Because it is dangerous equipment. You must handle it carefully. It is beautiful equipment because it is so small, and we went on using it for quite a while. But I never felt like manufacturing. First of all because I am not business minded. I designed one camera housing, the Rolleimarine, and that certainly was marketed and I got license fees for that.

I was never aiming to make money by diving. I tried to get money to finance my expeditions but not the other way around. So, for these reasons the idea of marketing didn't count because I was never thinking of how to make money by manufacturing this or that. This doesn't interest me. I am interested in making films and

writing books and especially in research. Also, we honestly thought we didn't want to take the responsibility with the oxygen equipment because it is so dangerous if you do not handle it properly. The aqualung is far safer equipment and you haven't to think quite so much. You only put in the mouthpiece and go down and breathe, and think of your reserve and the compression tables.

SPDM: What of Alfred, Joerg, and Xenophon?

Hass: Xenophon is back in his Greek Islands. Alfred was with Krupp in India. They made a big plant there, and he was in charge of that so he did very well. He was a lawyer in fact, he started as a lawyer.

Joerg's father was one of the most prominent surgeons in the world in bone structure. Joerg is just about as good as his father and he took over his hospital, so he's head of a hospital in Austria. He is still a very keen hunter, he was the keenest hunter among the three of us. In the war he was shot down and many of his bones were broken, but his father mended all that. But he didn't take up diving anymore, although he is still hunting on land.

SPDM: So he hasn't dived since World War II?

Hass: Not as far as I know. he may occasionally have done a dive, but not seriously.

SPDM: What about Alfred?

Hass: I don't think Alfred either. He was diving during the war and was involved with the military. I don't think he does too much diving. He is too busy in other things.

SPDM: When was the last time all of you dived together? For some reason it seems so much more recent.

Hass: Well, it's a long time back. It was in 1942, in Greek waters. That was our last expedition together. Now you see my constant companion." Hass smiled, nodding his head toward Lotte.

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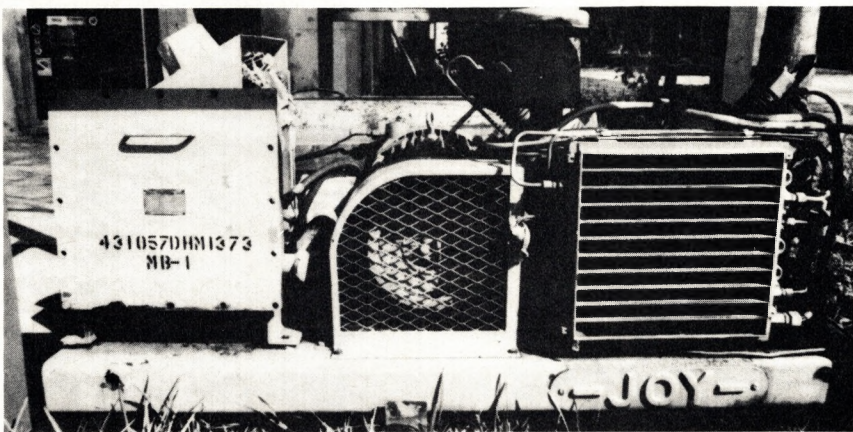
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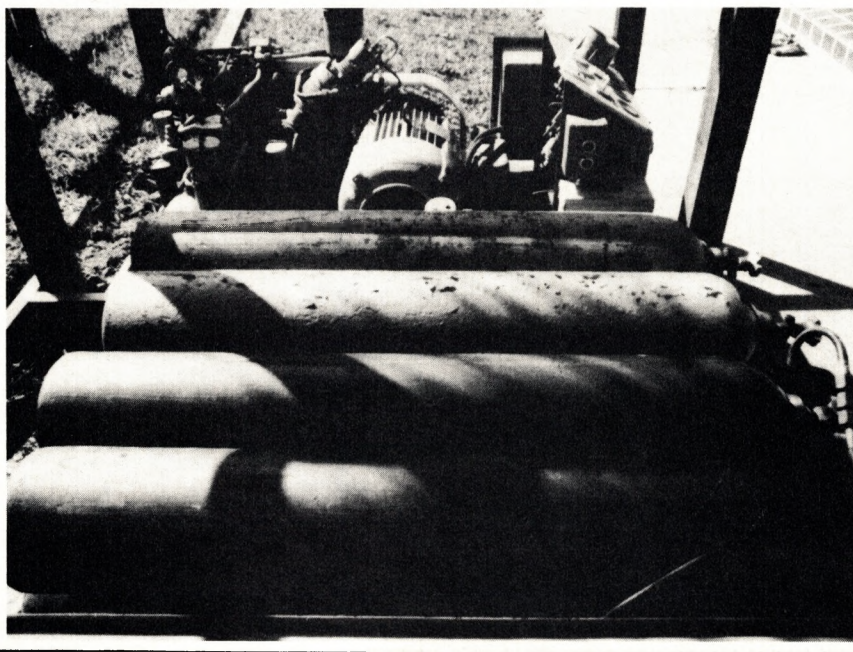
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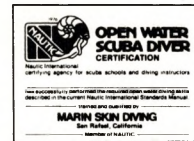
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Nautic International is the newest certification agency for scuba schools, diving instructors and divers.

If a person takes a diving course that includes more-than-average open water training, a minimum of five open water classes, taught by an instructor who went to school fulltime for twelve weeks in Monterey, California, chances are good the card they get will be a Nautic Open Water Scuba Diver Certification.

The Nautic instruction philosophy requires that every beginning diver get complete open water training before certification. Nautic has eliminated the "basic" training level and issues only open water diver ratings.

Instructor training and qualification for Nautic is done by Ed Brawley's Professional Diving Instructor College (P.D.I.C.) in Monterey.

P.D.I.C. is a state and veterans approved vocational school which operates year-round training instructors for careers in full-service diving schools and stores.

Improved open water training has always been top priority at P.D.I.C. The school has a reputation for innovative leadership both in diving techniques and methods for training instructors for open water teaching.

P.D.I.C. instructors learn to teach a course which is unique in the thoroughness and design of its open water skill levels. The course is the result of years of analysis with hundreds of students to develop diving techniques, teaching methods and a skill progression which is most effective at producing safe, comfortable, confident open water divers.

Nautic and P.D.I.C. are separate organizations which share a common instructional philosophy and work closely together. P.D.I.C. trains the instructors. Nautic provides certification and other services for instructors trained by P.D.I.C.

The NAUTIC INTERNATIONAL STANDARDS MANUAL, published this year explains the essential concepts in the Nautic instructional philosophy, and describes the specific open water skills and other performance required for a person to earn the Nautic Open Water Scuba Diver rating.

For more information about Nautic or P.D.I.C., you can write Nautic International, 3765 Redwood Highway, San Rafael, CA 94903.

number of people come in for treatment twenty-four and even forty-eight hours after pain begins to occur. Even so, time should not be considered insignificant. Neglection for delay of treatment can result in some serious medical problems.

One of the long-term effects of decompression sickness is called *Asceptic Bonochrosis*. This is a chronic condition caused by bubbles of nitrogen centering around the head of the "long" bones, such as the femur or the humerus. These gas bubbles obstruct the flow of blood the ball and socket joints, causing these weigh bearing bones to deteriorate and flatten out, which is very similar to painful arthritis. People who have had the bends may experience further symptoms of arthritis. During damp weather joints may swell and produce pain, very similar to Grandpa's complaining on a rainy day.

Early research on decompression sickness was conducted in England. Older treatments sometimes consisted of immersing the victim completely in a tub of ice. The theory was this would slow down the metabolism, reduce the size of the bubbles and lessen the pain. It does not work. In the early sixties, medical researchers conducted experiments under compression trying various operations, including open heart surgery. Some of these experiments were so successful as to arouse great speculation among the medical fraternity. Many quacks claimed miraculous cures ranging from headache relief to the cure of almost every ailment under the sun.

As recently as 1974, the Miami Heart Institute was conducting research using decompression chambers in the treatment of senility and other complications of old age. The theory revolves around re-oxygenation of the blood. Unfortunately, Tattler magazine caught wind of some of this information and published an article stating these treatments could cure depression, senility and impotence. Several elderly people felt the report was very sincere, and as a result the offices of the institute were flooded with inquiries. Demands for treatment and the subsequent publicity gave the research a disreputable connotation. There may have been some scientific basis for this research, but the undue exploitation quickly put an end to it.

The incidents of death due to the bends are now very low. In the state of Florida only two deaths can be attributed to the bends over the last eighteen years. Still, the importance of proper treatment should not be underestimated. Physiology of each particular human sometimes requires special treatment. One case in point; a diver came in for treatment of the bends. There were five other divers in his group. They all went to the same depth, for the same amount of time, but only one of the six obtained the bends. Each individual is different in respect to how he

may be affected. This fact helps to explain the 5% incident rate that occurs even when Navy decompression tables are followed to the letter.

In the case of decompression accidents, the most important thing to remember is the location of the nearest chamber. Possibly more important than that is, don't panic. Don't send the diver back down. This is improper and inadequate treatment which could result in even more damage. Simply get the diver to a decompression chamber as quickly and safely as possible. Rushing to the hospital as if it were a heart attack is not necessary, getting the proper treatment is. Plan your dives carefully and make room for allowances for all possibilities. Enjoyment of our underwater wonders is well worth the effort.



U.S. NAVY DIVING

The Navy diving statistics and diving accident/injury analysis for the period 1 January through 31 December 1975 show an enviable safety record.

In the course of 60,571 dives reported during this period, there were 86 accidents involving Navy operational dives. (One of these accidents resulted in a fatality, which equates to a fatality rate of 1.7 fatalities per 100,000 dives.)

This is an increase of nearly two and one half times the previous year's accident rate (5.8 per 10,000 dives). Some of this rise can be attributed to more conscientious reporting of minor accidents. For example, these figures include 13 ear squeezes, 5 mechanical injuries (cuts and bruises), 1 hyper-ventilation, and 5 oxygen intolerance of diving candidates. The cases of bends in 1975 (39) is the highest since 1970 when 40 bend cases were treated. Most cases of bends were attributable to pushing the decompression table to near their maximum limit of depth and/or time. This is particularly true of the 13 exceptional exposure table accidents. Change one to the diving manual now recommends going to the next longer table when the work is cold or arduous. (From Fathom, Summer 1976).

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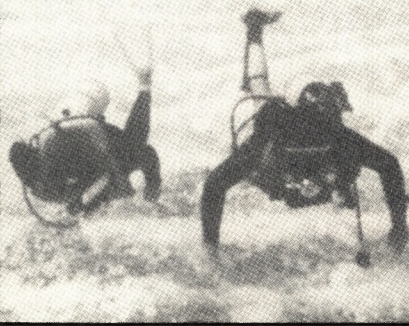
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by Kathy S. Bentley

For years scientists have been puzzled by the alarming increase of whale strands. A strand, as it is commonly referred to, is the mass beaching of whale herds, as if lured by an inner force toward land.

Such a marine disaster was experienced early this year in Jacksonville, Florida, as hundreds of pilot whales began beaching themselves along the coast near Mayport Naval Station. Word spread quickly throughout north

opportunity to further investigate the reasons for such tragedies. After two days and nights the surge was over. The final count: over one hundred dead pilot whales. Marine scientists and researchers converged on the scene, coming from major universities such as the University of Florida, Florida State University, and the University of North Florida. In order to salvage any substantial information which could lead to an answer, the

progress on the autopsies had been made by the beginning of the strand's third day. The Marine Patrol, which had been helping maintain control over the spectators, suddenly ordered all parties working on the whales to stop. It seemed they had received communications from the Smithsonian Institute requesting that the autopsies be terminated until they could be directed by the Institute's staff.

Richard H. Stewart



Florida, drawing hundreds of concerned citizens to the strand site. The turnout to divert the pilots back into the open sea began to resemble the blind leading the blind. Attempts to turn them back became futile as the whales once again returned to the beaches.

Such mass suicides have left marine scientists with many unanswered questions, and the Mayport strand offered an

university teams began immediate autopsies. How they died could be answered; from exhaustion. Sunburned and dehydrated, these vanishing buffalo of the sea were no match for dry land and direct sun. As the last pilot released its grip on life, the scientists, racing against time, began their unpleasant search hoping to obtain sufficient tissue samples before the pilot carcasses began to deteriorate. Significant

For a short period the half-dissected whale carcasses lay strewn along the beaches. When the Smithsonian's scientists arrived they began to remove the pilots from the waters for measuring and weighing before renewing the autopsies. The joint efforts of the Institute, the Marine Patrol, the US Navy and several dozen volunteers to remove the whales was successful, but the attempt to gain



Richard H. Stewart

As morning broke after a late evening of attempts to divert the Pilot whales back into the open sea, the beaches were strewn with the black-skinned carcasses, evidence of their unsuccessful attempts to save them (above). Dr. James Meade of the Smithsonian reiterates the Institute's policy of cooperation with state and local marine specialists during the exploratory investigation.

any meaningful information was not as successful. During the period between the order for the initial researchers to stop their work and the arrival of the Smithsonian's staff, the carcasses decomposed internally. Thus, many of the autopsy samples were beyond the point of being useful for lab research.

At the site, the Smithsonian representatives claimed their original message did not ask that the state and local scientists be prevented from doing the autopsies. So the question that arises in the aftermath of this ordeal is: who or what government agency should have authority over such marine disasters? Should government agencies or the Smithsonian Institute control all similar situations that may occur in the future, or should they only act as co-ordinators to insure that the proper specialists are able to perform the investigative work?

During the final day of the strand, U.S. Navy cranes were used to remove the Pilot whales from the water (below). Attempting to explain strand, specialists begin their lengthy exploratory investigation (below right).





continued from page 43

for taking lobsters and most other popular seafoods. While taking lobsters, every diver is required to carry a measuring device to prevent taking shorts. Size limits are 3 1/4 inches or more along the carapace, or from back of the eyes to the rear of the top solid shell. Open season extends from the first Wednesday in October through the first Wednesday after the 15th of March. The season limitation was imposed to protect the spiny lobsters during their breeding period. A single female carries thousands of eggs and it would be foolish to take her at this time. In addition, the removal of males lessens the possibility of needed maximum fertilization.

In Massachusetts, a separate lobster license is required and divers can bring up as many lobsters as they want. There is a size limitation of 3 3/16 inches along the carapace. Also, no female bugs carrying eggs can be taken nor any females with notched tails. A notched tail indicates that the female is a producing lobster that has been caught laden with eggs, notched by fishermen, and thrown back. Lobster laws in other Eastern Seaboard states vary widely, so be sure to investigate the local laws when crossing boundaries.

Handling After Catching

Place your freshly caught lobsters in a wet burlap bag or on ice as soon as you have brought them to the surface. This will prolong their life and keep them fresh. They may be kept alive overnight in the refrigerator. Lobsters are able to live several days out of sea water if kept cool.

The reason lobsters are cooked or quick frozen while still alive is to assure their freshness. A lobster, as with any seafood, begins to spoil as soon as it dies.

When a lobster dies, the digestive acids of the stomach and intestines eventually seep into the body and tail meat and accelerate spoilage. The digestive fluids are neutralized when boiled. Lobsters you buy in markets have been boiled to insure safety of the tail meat. Also, for the same reason, the frozen tails that you buy have been separated from a live lobster.

If a lobster dies, it should be cooked as soon as possible or the tail should be removed to prevent contamination by the fluids. It should be eaten the same day and should not be frozen for later use. The freshness of a live lobster can be determined by the tail. The tail should curl under the body when it is picked up.

Cooking Lobsters

The lobster is versatile and can be baked or broiled in or out of its shell, can be boiled whole, and its meat can be removed either before or after cooking for use in various dishes.

Clawed lobsters are graded by size. "Chicken" lobsters are the smallest

and weigh one pound. "Eights" weigh 1 1/8 pounds, "Quarters" weigh 1 1/4 pounds, "Large" weighs from 1 1/2 to 2 pounds, and "Jumbo" weighs over 2 pounds.

The flesh of the female lobster is preferred over the male. A female can easily be identified by the large swimmerettes on the tail.

The following basic methods of cooking and eating lobsters are among my favorites. They are very simple and emphasize the fun of eating lobsters.

Combination Plate Lobster Party

The best kind of camaraderie and a real turn-on to diving is a lobster party after a lobster dive. Bring your steak, salad, garlic bread, and wine along with you on the trip. Jump in and grab your bug, then help set up the barbecue. Have your buddy standing by with the steak. Put the lobster on the grill first, cooking it 5 or 10 minutes before placing the steak on the heat, for you will find lobster meat takes longer to cook than steak.

When both are almost ready, toss a couple of slices of garlic-buttered bread on the barbecue and toast them on both sides. Then find your plate, fork and knife, salad, and your wine. Find a good place to sit (preferably leaning on your buddy) and have at it. Use the following recipe for barbecuing the lobsters.

Barbecuing Lobster

Use lobster tails or a whole lobster split lengthwise. This method will give you juicy, succulent white meat when wrapped in foil.

With the coals all ready for barbecuing and the grill about 3 or 4 inches above the coals, wrap the lobster snugly in foil and place on the barbecue. Cook a one-half pound tail or a one-pound whole lobster about 15 minutes with the shell side down. Turn and cook another 10 minutes. Remove lobster from foil and serve.

For a nicely browned appearance, place the flesh side down on the grill after removing from foil and cook for 2 or 3 minutes until lightly browned.

If you like lobster meat with a lightly scorched or burned taste, leave the foil off and cook first with the flesh side down 5 minutes, then turn and cook 15 minutes with shell side down. Serve with plenty of melted butter.

Broiled Lobster

Use lobster tails or a whole lobster split lengthwise. To split a whole lobster, place the lobster on its back. Insert the point of a sharp knife just under the mouth and draw the knife down the whole length of the body, splitting the lobster into two halves. Open and remove the intestinal vein, liver, roe, and stomach. Save liver and roe. Crack claws.

Place the cleaned lobster on rack with shell side up about 6 inches from heat. Cook half-pound tail or a one-pound lobster 6 minutes, then turn.

Brush with melted butter and lemon juice. Cook 8 minutes more or until shell turns red and flesh becomes white and opaque and flecked with brown.

Previously boiled lobster can also be used and should be brushed with melted butter and cooked just until meat is heated through -- about 5 minutes. Sprinkle with paprika and serve with melted butter mixed with lemon juice.

Wrapping the lobster in foil will keep it moist and prevent burning. Add 5 minutes more to the cooking time if you use the foil method. Allow one 1 1/2 lobster for each serving.

Boiled Lobster

Drop live lobster head first into boiling salted water. Water should cover lobster. Place a lid on the pot and bring water back to boil.

Simmer about 7 minutes for one-pound lobster, 10 minutes for 1 1/2 pounds, 12 minutes for 2 pounds, 15 minutes for 3 to 5 pounds, and 20 minutes for large ones 6 to 10 pounds. Remove lobster and place under cold running water a few seconds, but do not soak. Serve hot and whole or remove the meat for creamed dishes or salads. If served whole, furnish individual dishes of melted butter.

Cleaning And Eating Clawed Lobster

It is the method of eating a whole boiled New England lobster at the table that is so enjoyable. The satin-smooth shell on your plate can be broken apart very easily. The meat can be extracted with slight pressure of a finger or a fork. Even the leg meat and succulent juices are released with little effort. This procedure for eating a spiny lobster requires a pair of gloves.

1. Twist off the claws.
2. Crack the claws with a nutcracker, lobster-crackers, mallet, pliers, or what have you.
3. Separate the tail piece from the body by arching the lobster's back until it cracks, then twist and pull.
4. Bend back and break off the flippers from the tail.
5. Insert a small fork or finger into the meat where the flippers broke off and push out the meat. Remove the intestinal vein. Cut the tail meat into bite-size pieces and dip into melted butter or favorite sauce.
6. Unhinge the back shell from the body.
7. Remove and discard the stomach sac behind the eyes. The remaining parts (grayish-green liver, white meat, and orange colored roe of the female lobster) are edible except for the spongy gills. The liver is called "tomalley" and turns green when it is cooked. Some people

consider the tomally the best eating of all. "Coral" is the word for the roe.

8. Crack open the lower part of the body. There is a lot of white meat in this section.
9. If you're still hungry you may eat the legs. Place a leg end in your mouth and suck out the meat as if it were a straw. This is delicious and is one of the fun parts of eating clawed lobster.

Cleaning And Eating Spiny Lobster

1. Twist off the antennae at the base. You will need gloves to protect your hands from the spines.
2. Crack the antennae with a nutcracker or mallet. Tasty chunks of meat are inside the base.
3. Separate the tail piece from the body by twisting half way around and pulling.
4. Split the underside of the tail lengthwise with a sharp knife or a pair of scissors.
5. Break open the tail by bending it backwards and then pull out the meat. Remove the intestinal vein. Cut the tail meat into bite-size pieces and dip into melted butter or your favorite sauce.
6. Unhinge the back shell from the body.
7. Remove and discard the stomach sac behind the eyes. The remaining parts (liver, white meat, and roe of the female lobster) are edible except for the spongy gills. Be sure to get all of the white meat around the head and antennae.
8. Crack open the lower part of the body. There is a lot of white meat in there.
9. On a large lobster, crack open the legs. This is the best part. The big chunks of leg meat are butter-tender. Small lobsters are hardly worth the bother.

Lobster Salad

- 2 cups diced lobster meat, cooked
- 1/4 cup chopped green beans, cooked
- 1/4 cup diced carrots, cooked
- 1/4 cup diced potatoes, cooked
- 1/4 cup small French peas, cooked
- 1/2 teaspoon salt
- 1/4 teaspoon garlic salt
- 4 tbsp mayonnaise
- 1 head lettuce
- 2 hard boiled eggs, sliced thin
- 1 tbsp chives, chopped

Mix lobster meat with vegetables, salt, garlic salt, and blend with mayonnaise. Use more mayonnaise if desired. Line bowl with lettuce and spoon mixture on top. Decorate with egg slices and chives. *Good luck and happy lobstering!*

THE ARCTIC IS GETTING COLDER

The northern Canadian Arctic has become markedly colder during the past 20 years. Analysis of the upper air indicates that this has resulted in changes in atmospheric circulation across the area.

July freezing temperatures have been occurring at much lower altitudes at nine monitoring stations in the Canadian Arctic Archipelago during the past nine years. This is the report of Raymond S. Bradley of the University of Colorado's Institute of Arctic and Alpine Research. A similar pattern is apparent for summer months as well.

Previous observations of the cooling found that the summers of 1963-66 on Ellefsmers Island "were the coldest sequence of summers since before 1925," and that the elevation at which the glaciers remained in equilibrium was now 300 meters lower. Another recent study documents a marked change toward more severe ice conditions in Baffin Bay and Davis Strait since 1963. Bradley's data supports these studies.

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BIOGRAPHICAL SKETCH
of Jack McKenney

Jack McKenney is a free-lance under-



water cameraman, topside cameraman, film producer, writer and photographer. For eight years he was on the staff of *Skin Diver Magazine* with four of those years in the capacity of editor. McKenney began diving in Ontario, Canada, 25 years ago in quarries, rivers and the Great Lakes. A NAUI instructor since 1963 (NAUI 306), he lived for three years in the Bahamas where he worked as a program director, diving instructor, and dive guide at the Underwater Explorers Club in Freeport.

Jack has won four gold medals for four gold medals for four different underwater motion picture films, all produced in the Great Lakes area, and has won many silver, bronze, and special merit awards. For his contributions to the field of underwater photography, he was on the honor roll in 1968 at the 9th International Underwater Film Festival in Santa Monica. In September of 1971, he was awarded the Midwest Underwater Photographer of the Year award by the Universal Diving School of Chicago, and in 1974 he was presented with the BOSTON SEA ROVERS Diver of the Year award. In 1975 he was presented with the OUR WORLD UNDERWATER award. He has also been instrumental in initiating and instructing underwater photo classes.

McKenney has had his work published in many different books and magazines, and has travelled to Mexico,

Canada, French Polynesia, the Virgin Islands, the Bahamas, British Honduras, Central America, the Cayman Islands and Australia for *Skin Diver Magazine* to report on diving conditions and activities. In 1968 he was part of a three man photo team to document the attempted salvage of the Andrea Doria, and in 1973 he joined Oceanic Films and Saturation Systems to once again document another attempt to salvage the Doria. As a cameraman and stuntman for Cornel Wilde's theatrical release, "Sharks' Treasure," he travelled to the Coral Sea to film sharks. In August of 1975, he was and underwater cameraman for Peter Gimbel, filming the Andrea Doria for a one hour Xerox Corp./CBS network television special. To date he has made 31 dives on this famous shipwreck. In the summer of 1976 McKenney doubled Nick Nolte underwater in Columbia Pictures' "The Deep." He was on location in the British Virgin Islands, Bermuda and Australia for three and a half months.

He has been a member of the K-W DOLPHINS (Canada's only oxygen rebreather diving club), and is an honorary member of a number of dive clubs.

Each year Jack takes part in many major underwater film festivals to present both motion picture films and slides. His easy going, light-hearted presentations are a favourite with divers and non-divers alike.

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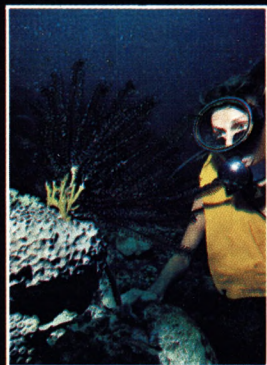
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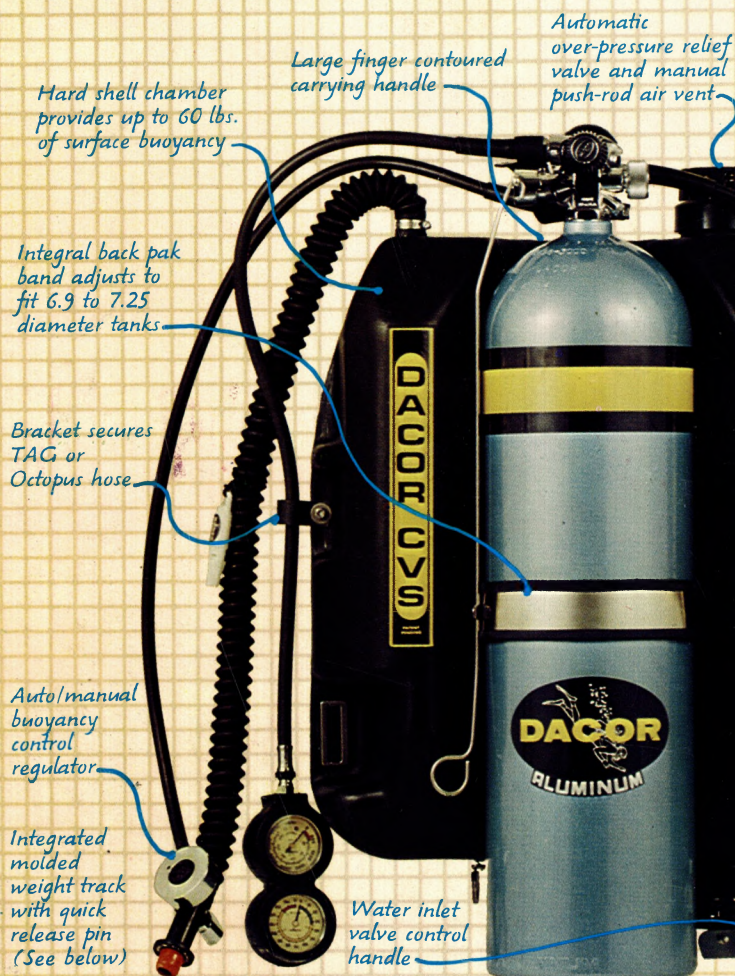


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